Version 2.0 A

DAYSTAR DIGITAL

Universal PowerCache

For the Macintosh SE/30, LC, LC II, II, IIx, IIcx, IIsi, IIci, IIvx, IIvi and Performa 400, 600

Classic, Color Classic, SE, and LC III Owners

Refer to the installation manual received with your adapters.

INSTALLATION / USER MANUAL

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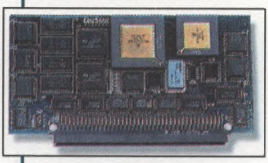
About The PowerCache

About the PowerCache



Thank you for purchasing the DayStar PowerCache. You have purchased a performance upgrade with unsurpassed compatibility, reliability and performance.

The PowerCache is the logical extension of the FastCache with CPU acceleration. The PowerCache substantially increases Macintosh system speed and responsiveness. Users benefit through increased productivity. You are able to complete more work in a day or spend the time saved to improve work quality.

It is based on the Motorola 68030 CPU and an optional 68882 math chip, which operate at 33, 40 or 50 MHz clock speeds. The PowerCache includes a 32K high-speed Static RAM cache that allows the CPU to operate at faster speeds without the user having to add new high-speed SIMMs.

There are currently two types of PowerCache cards - The Universal PowerCache is a single universal design which plugs directly into the accelerator/PDS slot in the IIci, IIvi, IIvx or Performa 600. With the addition of a machine specific adapter, the PowerCache works in the Classic, SE, SE/30, LC, LC II, II, IIx, IIcx, IIsi or Performa 400. The Universal PowerCache with the SE/30 adapter plugs into the SE/30 PDS slot. The SE/30 PowerCache provides the same level of performance, but leaves the SE/30 PDS slot open for any PDS board, including video or Ethernet boards. Owners of either PowerCache may swap boards with DayStar at no charge.

The PowerCache is 100% compatible with all standard Macintosh hardware and software. Once installed, the PowerCache is transparent to the user. The Macintosh operates exactly as before, except the user notices significant gains in performance.

The PowerCache's built-in 32K Static RAM cache increases the CPU's processing speed by eliminating the time spent waiting for the relatively slow motherboard SIMMs. This waiting time is commonly called a wait state. The faster clock speed of the 68030 lets it process more quickly. Without a cache, however, it still has to wait for data and instructions from the motherboard SIMMs. This causes a large performance penalty.

With the PowerCache, the CPU gets the information it needs from the faster memory of the cache without having to wait for the motherboard SIMMs. No additional high speed memory is required, which preserves the user's original investment.

Unlike NuBus based CPU accelerators, a PowerCache without a math chip will continue to use the motherboard's math coprocessor (except for the Mac IIsi, LC, and LC II which don't have a motherboard math coprocessor). Customers who do math intensive work such as complex spreadsheet recalculations, 3D rendering or modeling, or work with scientific applications like Mathematica, may wish to update the PowerCache with the matching speed 68882 math chip.

PowerMath

DayStar's PowerMath is a powerful software utility that boosts the performance of math-intensive tasks which don't use the math chip directly. PowerMath traps application calls to Apple's Standard Apple Numeric Environment (SANE) routines and diverts them to the 68882 math chip (either on the motherboard or PowerCache, depending on the upgrade installed). This can greatly increase performance over that of standard SANE, without compromising accuracy, a feature unique to DayStar's software.

Swapping Adapter Boards

Installing the PowerCache in any Macintosh other than the IIci requires a machine specific adapter. You can always swap adapters with DayStar for no additional charge. Simply contact DayStar at 800-962-2077 to arrange the swap.

Swap-Up Program

DayStar has always provided upgrade paths for our customers. In this tradition, when 33 or 40 MHz PowerCache owners are ready for additional performance they can return their card for credit towards a 50 MHz PowerCache. DayStar is also committed to offering PowerCache owners a cost effective upgrade to future 68040 based DayStar products. For further information, turn to page 122, "Upgrading the PowerCache" in Appendix B.

Included with your PowerCache

The PowerCache is shipped with the following parts:

- PowerCache in an anti-static bag
- PowerCache Installation Manual
- Power Central disk
- Anti-Static foam (located on the adapter's pins - II, IIx, IIcx only)
- Anti-Static wrist strap

Included with your Adapter

- Electrical tape (removable 2pcs on strip) (SE/30 version only)
- PGA puller (II, IIx version only)
- Rubber pad (LC, LC II, IIx version only)
- Power Supply removal tool (IIcx version only)
- Anti-Static Motherboard bag (IIcx version only)
- #15 Torx (compatible) Screwdriver (SE/30 only)
- Case Separating Tool (SE/30 only)

Installation tools required

Installation tools required:

- Phillips Screwdriver
- Pliers (optional, LC & LC II only)

If any of the parts listed above are missing when you receive your PowerCache, please contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

Complete the warranty card

As DayStar continues to improve and enhance its product line, we would like to keep you informed of new product advancements. To take advantage of our upgrade programs and new product releases, please take a moment to complete the product warranty card.

About this manual

This manual provides basic information for installing and using the DayStar PowerCache for the Macintosh SE/30, LC, LC II, II, IIx, IIcx, IIsi and IIci. If you are unfamiliar with using the Macintosh, review the Owner's Guide before installing the board.

Here's what you'll find in this manual:

- **Chapter 1:** "Getting Started" lists some of the precautions which should be taken before installation. It also includes quick reference sections for installing the PowerCache.
- **Chapter 2:** "Installing The PowerCache - Macintosh SE/30" includes detailed instructions for the preparation and installation of the PowerCache in a Mac SE/30. It includes a section on testing the installation.
- **Chapter 3:** "Installing The PowerCache - Macintosh LC, LC II, Performa 400" includes detailed instructions for the preparation and installation of the PowerCache in a Mac LC, LC II and Performa 400. It includes a section on testing the installation.
- **Chapter 4:** "Installing The PowerCache - Macintosh II" includes detailed instructions for the preparation and installation of the PowerCache in a Mac II. It includes a section on testing the installation.
- **Chapter 5:** "Installing The PowerCache - Macintosh IIx" includes detailed instructions for the preparation and installation of the PowerCache in a Mac IIx. It includes a section on testing the installation as well as special information about socketing the CPU in your IIx.

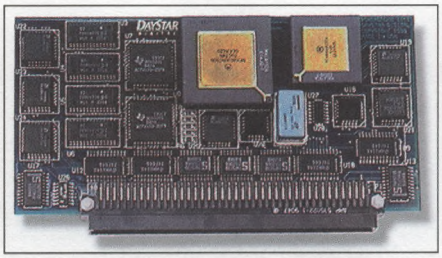
- **Chapter 6:** "Installing The PowerCache - Macintosh IIcx" includes detailed instructions for the preparation and installation of the PowerCache in a Mac IIcx. It includes a section on testing the installation as well as special information about socketing the CPU in your IIcx.
- **Chapter 7:** "Installing The PowerCache - Macintosh IIsi" includes detailed instructions for the preparation and installation of the PowerCache in a Mac IIsi. It includes a section on testing the installation.
- **Chapter 8:** "Installing The PowerCache - Macintosh IIci, IIvx, IIvi, Performa 600" includes detailed instructions for the preparation and installation of the PowerCache in a Mac IIci, IIvx, IIvi and Performa 600. It includes a section on testing the installation.
- **Chapter 9:** "Installing The PowerCache Software" covers the procedures for installing and using the software included with the PowerCache. It also contains a section on troubleshooting, should you experience any problems.
- **Appendix A:** "Performance Tips & Adding A Math Chip" discusses ways to increase your system's performance and how to add a math chip if you purchased a PowerCache without one.
- **Appendix B:** "Product Support" includes the product specifications, warranty and how to return the PowerCache for service.

CHAPTER 1

Getting Started

Please read all of the instructions before you start the installation procedure. The Quick Installation Reference is meant for those who have prior experience installing DayStar PowerCaches in specific Macintoshes. Since all installations vary, we recommend that the full installation instructions be followed the first time you install a PowerCache in a specific Mac model.

Power Central



Important: DayStar recommends you have the PowerCache installed by your dealer or an Apple Authorized Technician. You can severely damage electronic circuitry or sustain serious personal injury.

The Danger of Static Electricity

WARNING: The DayStar PowerCache uses electronic components that are sensitive to static electricity. When handling and installing these boards, you must take care to prevent the components from being damaged by static currents. Always work in an area of low static electricity. Connect the anti-static bracelet to a grounded surface to prevent static discharge.

Precautions

Here is a brief list of precautions that help ensure proper grounding:

- **WEAR THE ANTI-STATIC BRACELET.**
- **DO NOT** attempt installation on a carpeted floor.
- **DO NOT** wear leather shoes — we recommend shoes with rubber soles.
- **DO NOT** attempt installation in an overly dry environment — spray mist the work area with water prior to installation.
- **DO NOT** wear silk or polyester clothing while doing the installation — we recommend cotton clothing.
- **REMOVE ALL JEWELRY** (rings, bracelets, watches, etc.) before installation.

Installation in the new Macs

The Universal PowerCache is compatible with most of the new Mac platforms being introduced during the fall of 1992.

Installation in the new Mac Performa 400 and 600 as well as Apple's new Mac IIvx and IIvi are similar to other existing Mac platforms.

Performa 400: The PowerCache will use the same adapter as the Mac LC, LC II. In fact the only difference is the actual exterior case design of the Mac. Follow the instructions for the LC, LC II installation on pages 41 to 48.

Mac IIvx, IIvi, Performa 600: The PowerCache plugs directly into the accelerator slot (no adapter needed). The accelerator slot is exactly the same in position and form within the Mac's case as the cache slot on the Mac IIci. Follow the instructions for the Mac IIci installation on pages 101 to 104.

Installation in the Mac Classic and SE

New adapters will begin shipping in the fall of 1992 which allow the Universal PowerCache to support the Classic and SE. Versions of these adapters which support external monitors will be available at a later date. Refer to the manual shipped with the adapters for installation instructions.

Quick installation reference for the *Mac SE/30*

WARNING!

DayStar recommends you have the PowerCache installed by your dealer or an Apple Authorized Technician. The Mac SE/30, when open, exposes the installer to a CRT vacuum tube which can implode or cause extreme electrical shock.

NOTE: An adapter is required for installing the PowerCache into the SE/30.

If you are experienced in the installation of enhancement boards for the **Macintosh SE/30**, follow these steps:

1. **Remove all connectors and the AC power cord.**
2. **Flip power switch 3 times.**
3. **Let the unit sit for 1 hour** - to discharge.
4. **Remove four screws and the cover.**
5. **Install the included electric tape** - Over the ends of the frame's front and rear mounting brackets.
6. **Connect PowerCache to adapter board.**
7. **Install the combined board.**
8. **Re-assemble the cover** - Make sure all cables are properly connected.
9. **Test the installation** - Attach the AC power cord. Restart the Mac SE/30. You should hear the customary BONG, but it may sound slightly shorter.
10. **Install Power Central software** - Boot from the DayStar floppy and copy the Power Central file from the DayStar disk to the System Folder of your startup disk. If you are running System 7, copy the file to the Control Panels folder inside the System Folder.
11. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

If you are experienced in the installation of enhancement boards for the **Macintosh LC LC II, and Performa 400,** follow these steps:

1. **Remove all connectors and the AC power cord.**
2. **Remove the Mac cover.**
3. **Bend or break off the large tab on the inside of the top cover (LC, LC II).**
4. **(Early LC Models Only) Loosen and bend the large capacitor back** - (directly below the large tab on the cover.)
5. **Install rubber pad on motherboard chip near back of unit.**
6. **Connect PowerCache to adapter board.**
7. **Install the combined board.**
8. **Add rubber pad to back of PowerCache.**
9. **Test the installation** - Attach the AC power cord. Restart the Mac. Listen for the (shorter) customary BONG, *then turn off.*
10. **Replace the cover** - Make sure all cables are properly connected.
11. **Install Power Central software** - Boot from the DayStar floppy and copy the Power Central file from the DayStar disk to the System Folder of your startup disk. If you are running System 7, copy the file to the Control Panels folder inside the System Folder.
12. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

Quick installation reference for the *Mac LC, LC II, Performa 400*

NOTE: An adapter is required for installing the PowerCache into the LC, LC II, and Performa 400.

Quick installation reference for the *Mac II*

CAUTION: If you are not experienced at removing processors, follow the detailed instructions in Chapter 4.

NOTE: An adapter is required for installing the PowerCache into the II.

If you are experienced in the installation of enhancement boards for the **Macintosh II**, follow these steps:

1. **Remove all connectors and the AC power cord.**
2. **Remove the Mac II cover and disk tray.**
3. **Remove the CPU and AMU chips** - Use the PGA puller provided with the board.
4. **Install the adapter board** - Align the adapter board's pins over the empty CPU and AMU socket. Press above the socket connection until the board is seated.
5. **Connect PowerCache to adapter board.**
6. **Test the installation** - Attach the AC power cord. Restart the Mac II. Listen for the (shorter) customary BONG, *then turn off.*
7. **Replace the disk tray and cover** - Make sure all cables are properly connected. Replace the disk tray and cover.
8. **Install Power Central software** - Boot from the DayStar floppy and copy the Power Central file from the DayStar disk to the System Folder of your startup disk. If you are running System 7, copy the file to the Control Panels folder inside the System Folder.
9. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

If you are experienced in the installation of enhancement boards for the **Macintosh IIx**, follow these steps:

1. **Remove all connectors and the AC power cord.**
2. **Remove the Mac IIx cover and disk tray.**
3. **Check to see if the CPU in your Mac IIx needs socketing** — If it needs a socket, contact DayStar Technical Support for more information on how to proceed.
4. **Remove the CPU chip** - Use the PGA puller provided with the board.
5. **Install the rubber pad on the speaker magnet.**
6. **Connect PowerCache to adapter board.**
7. **Install the combined board** - Align the combined board over the empty processor socket. Press above the socket connection until the board is seated.
8. **Test the installation** - Attach the AC power cord. Restart the Mac IIx. Listen for the (shorter) customary BONG, *then turn off.*
9. **Replace the disk tray and cover** - Make sure all cables are properly connected. Replace the disk tray and cover.
10. **Install Power Central software** - Boot from the DayStar floppy and copy the Power Central file from the DayStar disk to the System Folder of your startup disk. If you are running System 7, copy the file to the Control Panels folder inside the System Folder.
11. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

Quick installation reference for the *Mac IIx*

CAUTION: It is possible that the processor is soldered into the motherboard and that the unit must to be sent to DayStar for socket installation. If you are not experienced at removing processors, follow the detailed instructions in Chapter 5.

NOTE: An adapter is required for installing the PowerCache into the IIx.

Quick installation reference for the *Mac IIcx*

CAUTION: The processor is most likely soldered into the motherboard and will require socket installation by DayStar. If you are not experienced at removing processors, follow the detailed instructions in Chapter 6.

NOTE: An adapter is required for installing the PowerCache into the IIcx.

If you are experienced in the installation of enhancement boards for the **Macintosh IIcx**, follow these steps:

1. **Remove all connectors and the AC power cord.**
2. **Remove the Mac IIcx cover and remove the power supply from the IIcx.**
3. **Check to see if the CPU in your Mac IIcx needs socketing** — If it needs a socket, contact DayStar for more information on how to proceed. If it is already socketed, contact DayStar to have a PGA puller sent to you. If socketed, remove the CPU.
4. **Install the adapter** - Align the adapter *above* the empty processor socket. Slightly pull the adapter toward the front of the Mac to move the plastic power supply tab out of the way. Once aligned, gently press the center of the socket connection until it is firmly seated.
5. **Reinstall the power supply.**
6. **Connect the PowerCache to the adapte**r.
7. **Test the installation** - Attach the AC power cord. Restart the Mac IIcx. Listen for the (shorter) customary BONG, *then turn off.*
8. **Replace the cover** - Make sure all cables are properly connected.
9. **Install Power Central software** - Boot from the DayStar floppy and copy the Power Central file from the DayStar disk to the System Folder of your startup disk. If you are running System 7, copy the file to the Control Panels folder inside the System Folder.
10. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

If you are experienced in the installation of enhancement boards for the **Macintosh IIsi**, follow these steps:

1. **Remove all connectors and the AC power cord.**
2. **Remove the Mac IIsi cover.**
3. **Connect PowerCache to adapter board.**
4. **Install the combined board.**
5. **Test the installation** - Attach the AC power cord. Restart the Mac IIsi. Listen for the (shorter) customary BONG, *then turn off.*
6. **Replace the cover** - Make sure all cables are properly connected. Replace the cover.
7. **Install Power Central software** - Boot from the DayStar floppy and copy the Power Central file from the DayStar disk to the System Folder of your startup disk. If you are running System 7, copy the file to the Control Panels folder inside the System Folder.
8. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

Quick installation reference for the *Mac IIsi*

CAUTION: The PowerCache should not be installed into other Mac IIsi PDS adapters. Only DayStar adapters provide the correct pin configuration.

NOTE: An adapter is required for installing the PowerCache into the IIsi.

Quick installation reference for the *Mac IIci, IIvx, IIvi, Performa 600*

If you are experienced in the installation of enhancement boards for the **Macintosh,** follow these steps:

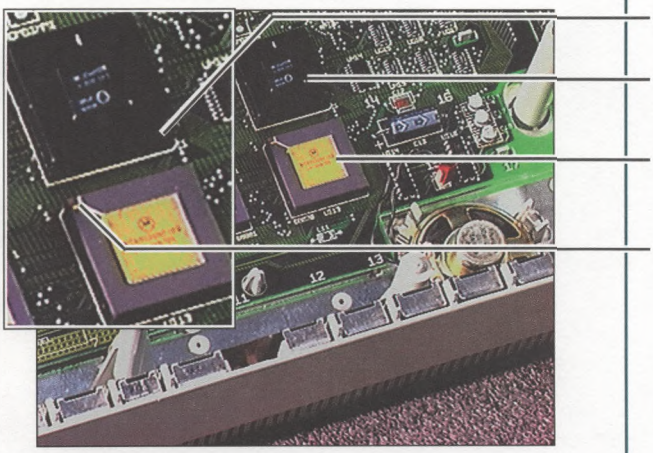
1. **Remove all connectors and the AC power cord.**
2. **Remove the Mac cover.**
3. **If present, remove Apple or other third party cache card from cache connector slot.**
4. **Connect PowerCache to the cache connector slot.**
5. **Test the installation** - Attach the AC power cord. Restart the Mac. Listen for a (longer) customary BONG, *then turn off.*
6. **Replace the cover** - Make sure all cables are properly connected. Replace the cover.
7. **Install Power Central software** - Boot from the DayStar floppy and copy the Power Central file from the DayStar disk to the System Folder of your startup disk. If you are running System 7, copy the file to the Control Panels folder inside the System Folder.
8. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

NOTE: No adapter is required for installing the PowerCache into the IIci, IIvx, IIvi and Performa 600.

Removing the PowerCache

If you must remove the PowerCache, follow the instructions below:

1. Remove the PowerCache from either the motherboard (Mac IIci, IIvx, IIvi, and Performa 600) or the adapter (all other Mac platforms).
2. Remove the adapter card from the motherboard socket (Mac II, IIx, IIcx), or motherboard connector (Mac SE/30, LC, LC II, IIsi, Performa 400). This concludes SE/30, LC, LC II, Performa 400, and IIsi removal.
3. Replace the CPU and (AMU chip on Mac II) by carefully aligning pin 1 on the chips with the appropriate pin 1 on the motherboard. (The gold Y-line is pin 1 on the 680X0 chip. The raised bump is pin 1 on the AMU chip. The white dot on the sockets is pin 1 on the motherboard.)



CPU and AMU Pin 1 orientation, Mac II

4. Gently press the center of the chip(s) until they are seated into the socket. This concludes II, IIx, IIcx removal.

CHAPTER 2

Installing The PowerCache–Mac SE/30

DayStar recommends you have the PowerCache installed by your dealer or an Apple Authorized Technician. The Mac SE/30, when open, exposes the installer to a CRT vacuum tube which can implode or cause extreme electrical shock.

WARNING!

Preparing the Mac SE/30 for installation

Installation of the DayStar PowerCache was designed to be easy. You must, however, take certain precautions:

1. **Backup all hard drives** before beginning the installation.
2. **Turn off the Macintosh SE/30** and remove the AC power cord and all accessory cables from the back of the Macintosh.
3. **Flip the power switch** on rear of the Macintosh SE/30 three times to drain the power supply.
4. **Let the machine sit for 1 hour** so that the CRT screen's electrical charge can discharge.
5. **Place the Macintosh SE/30** on an unobstructed flat work area with the front of the Macintosh facing down.

Begin the installation

1. If you have installed the Reset switch (or Programmer's switch), remove it.
2. Using the Torx (compatible) screwdriver, remove the four cover screws on the rear of the Mac.

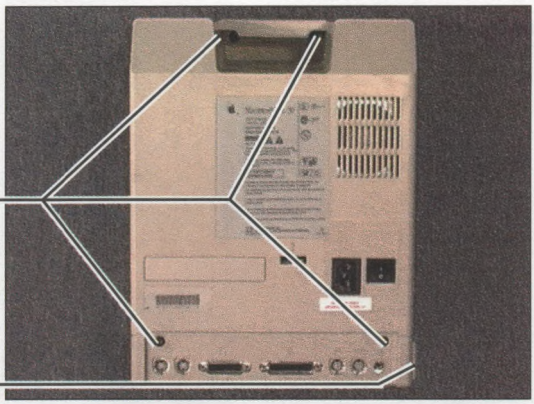


Figure 1 - SE/30 cover screw locations

3. Place the case separating tool into the case's gap and carefully apply pressure to loosen the case's rear from the front of the computer. You will need to perform this all the way around the case before it will come apart. With the case open, also remove the aluminum Radio Frequency shield.

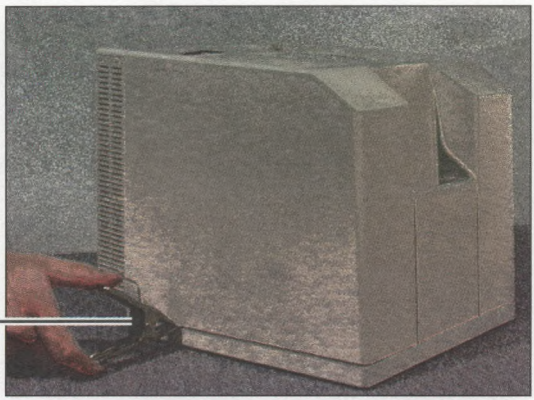


Figure 2- Separating case

4. Carefully place the Macintosh back on its bottom, being certain not to make contact with the CRT or power supply.

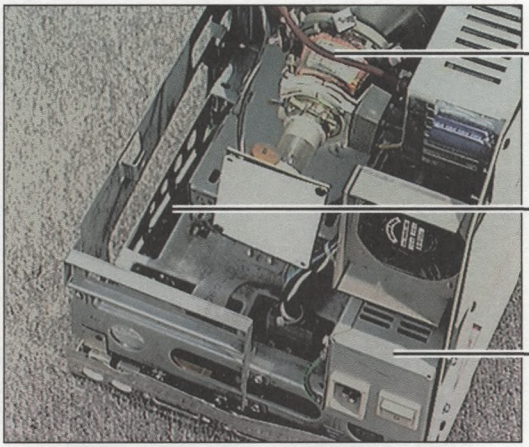


Figure 3 - Macintosh SE/30 opened

5. Locate the mounting brackets on the Macintosh SE/30's chassis.

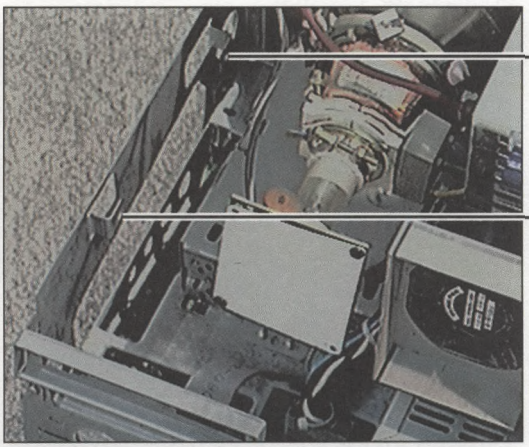


Figure 4 - Locating mounting brackets

Insulating the brackets

6. Install the included electrical tape to the ends of the front and rear brackets.

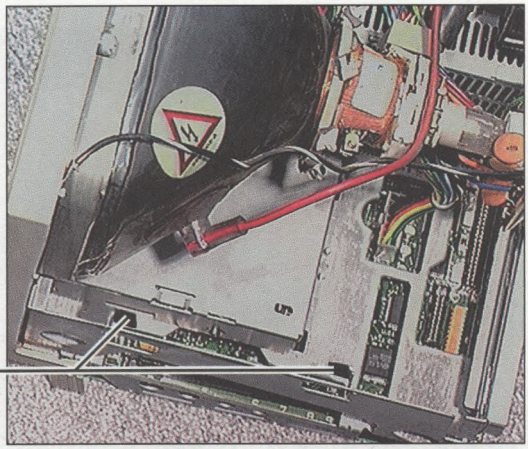


Figure 5 - Brackets modified for installation

Preparing the PowerCache

7. Align the PowerCache card with the included adapter board. Squeeze the connectors together with both hands until the board is fully seated.

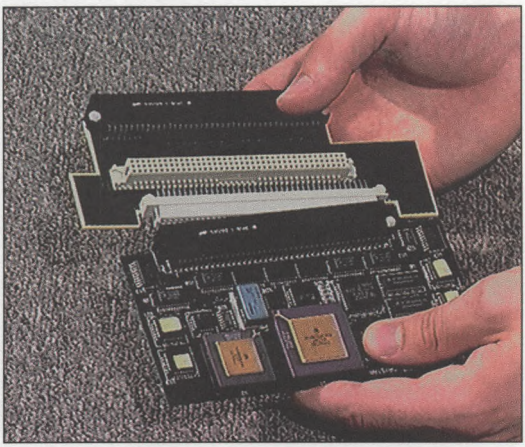


Figure 6 - Connecting PowerCache to Adapter

8. Carefully maneuver the combined board over the PDS slot on the Macintosh SE/30's motherboard.

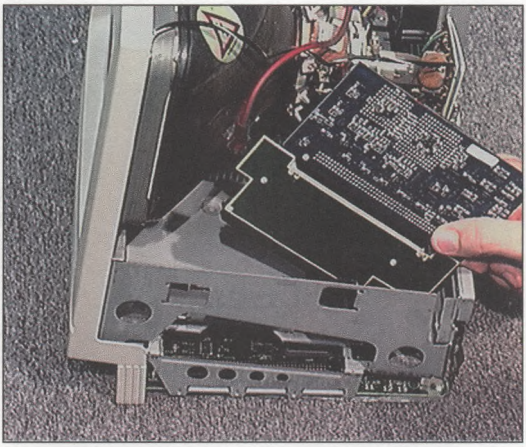


Figure 7 - Maneuvering combined boards

9. When the combined board is aligned over the motherboard's PDS slot, gently press down until it is fully seated.

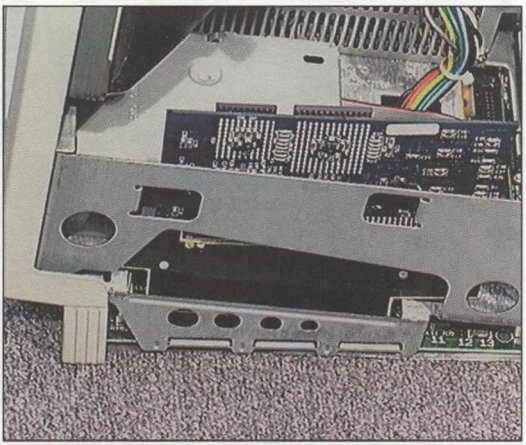


Figure 8 - Installing the combined boards

10. The PowerCache is now installed.

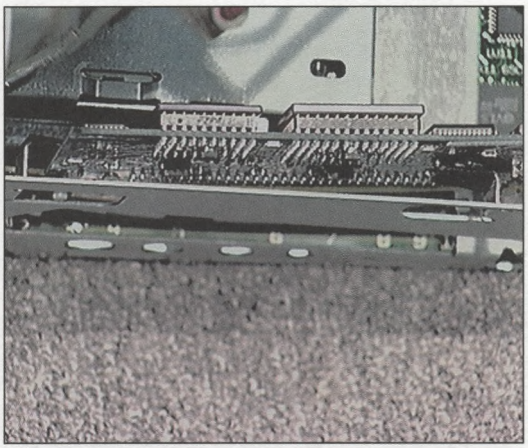


Figure 9 - PowerCache installed

11. Place the Macintosh back on its face and replace the metal shield and the cover. Do not fully tighten the screws until after testing the installation.

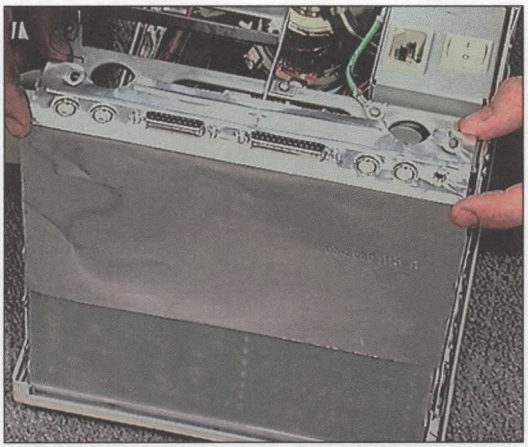


Figure 10 - SE/30 on face replacing shield

Plug the AC power cord into the back of the Macintosh SE/30. Flip the power switch on the back of the Macintosh. You should hear the customary BONG, but it may sound slightly shorter. If you do not hear the BONG, go to the next page.

YES! I hear the BONG.

1. Turn the power off and remove the AC power cord from the Mac.
2. Tighten the case's cover screws.
3. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the PowerCache Software."

Testing the installation

Please read all of this section before you test the installation.

NO! I DO NOT hear the BONG.

Symptom: There is no response when the power to the Macintosh SE/30 is turned on.

Symptom: The Macintosh SE/30 doesn't startup properly when the power is turned on.

Symptom: A different sound *(the failure tone)* is heard when power is turned on

If you experience any of the above, turnoff the machine and remove the AC power cord from the back of the Mac SE/30, then do the following:

1. Flip the switch 3 times, wait one hour for discharge.
2. Review Chapter 2. Verify proper installation, making sure the PowerCache and the Adapter are fully seated over the PDS slot.
3. Plug the AC power cord into the back of the Macintosh SE/30 and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

CHAPTER 3

Installing The PowerCache–Mac LC, LC II, Performa 400

The PowerCache installation procedures are similar for the Mac LC, LC II, and Performa 400. The same adapter works in the Mac LC, LC II, and Performa 400.

Installation of the DayStar PowerCache was designed to be easy. You must, however, take certain precautions:

1. **Backup your hard drive** before beginning the installation.
2. **Turn off the Macintosh** and remove the AC power cord and all accessory cables from the back of the Macintosh.
3. **Press the power switch** on the right rear of the Mac on and off to drain the power supply.
4. **Place the Macintosh** on an unobstructed flat work area with the front of the Macintosh facing you.

Prepare the Macintosh for installation

Note on the Performa 400: The opening of the case will vary slightly from the Mac shown. You may want to refer to your Mac's user manual.

Begin the installation

1. Using a small Phillips head screwdriver, remove the single screw in the rear of your Macintosh.

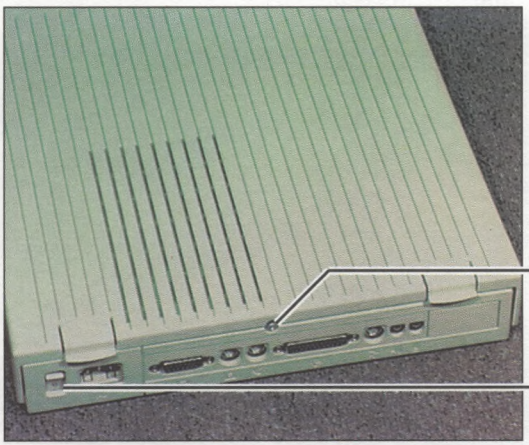


Figure 11 - Rear view of the Macintosh LC or LC II

2. Lift the two latches on both sides of the back cover up and out while raising the cover from the Macintosh. Note: This procedure is detailed in the Apple Macintosh Owner's Guide.

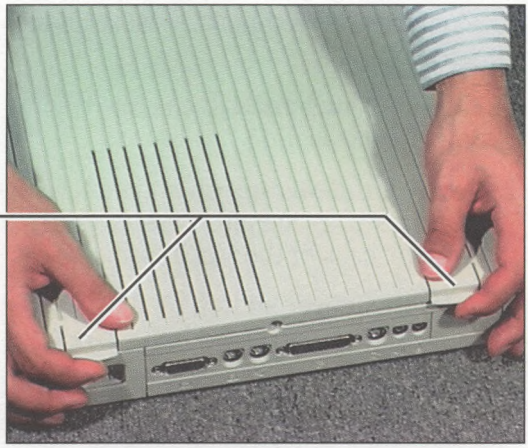


Figure 12 - Opening the cover

3. Locate the Macintosh PDS adapter. It is at the rear of the computer. This is where the Cache Adapter and PowerCache will connect to the Mac.

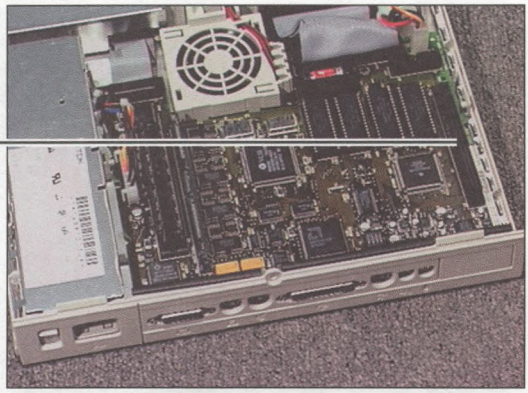


Figure 13 - Locating PDS connecter

4. Since the PowerCache and adapter fill all available expansion space, you must move an existing tab on the lid of the Mac LC or LC II. With the cover upside down and facing you, locate the singular tab centered in the right rear quadrant of the cover.

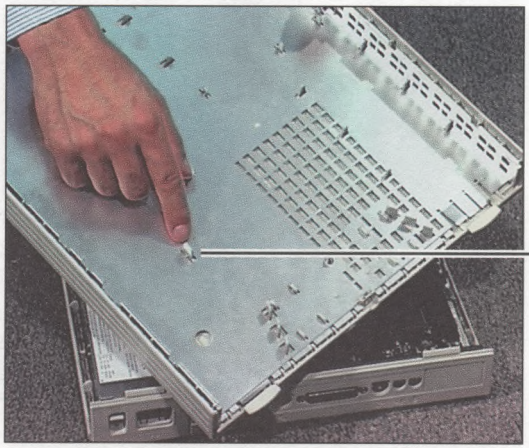


Figure 14 - Locating the stabilizer tab

5. Using a pair of pliers or your thumb, carefully bend the tab back against the inside of the lid.

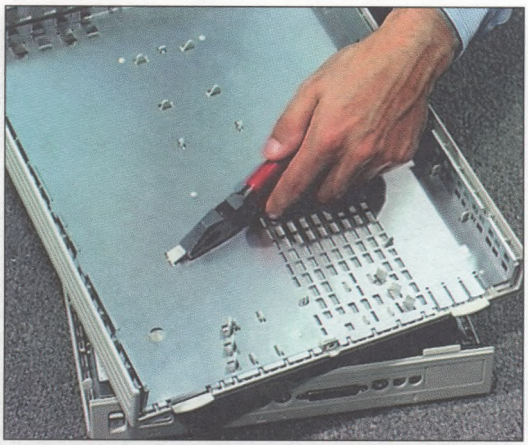


Figure 15 - Bend the tab

6. **Mac LC only** – Check the rear of your motherboard for a large capacitor stuck to the top of a chip with silicone gel. If no capacitor exists, skip the next step and proceed with "Preparing the PowerCache."

NOTE: On a small number of early Mac LC's, Apple glued a large capacitor on top of one of the chips with a silicone gel. This capacitor must be moved or the cover will not fit. The LC II does not have such a capacitor.

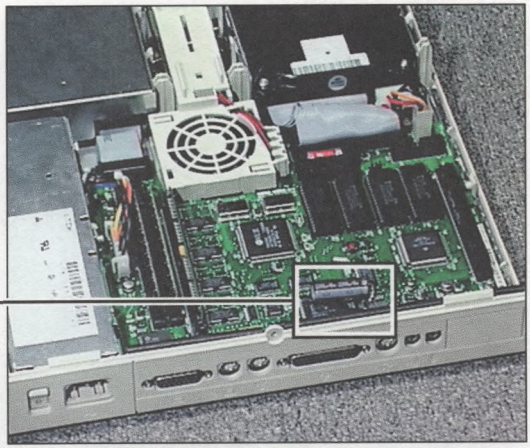


Figure 16 – Checking for a capacitor

7. **Mac LC only** – Peel the capacitor off the silicone gel. Carefully roll the capacitor off the chip and towards the front of the Mac until it lies flat on the green motherboard.

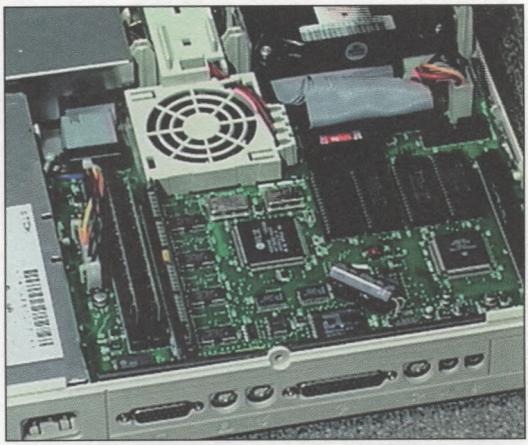


Figure 17 – The capacitor moved

8. Install the rubber pad on top of the "ferrite cube", which is located directly behind the ADB port.

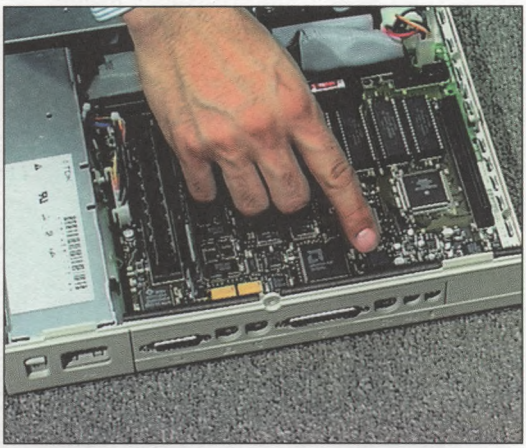


Figure 18 - Installing rubber pad on the motherboard

9. Align the PowerCache card with the included adapter board. Squeeze the connectors together with both hands until the board is fully seated.

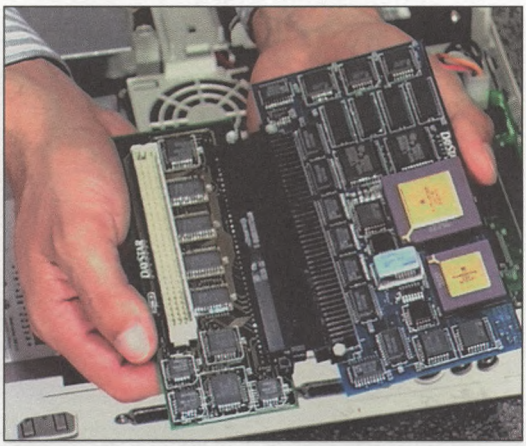


Figure 19 - Connecting the PowerCache and adapter

Installing the DayStar PowerCache

10. Carefully maneuver the combined board over the PDS slot on the Mac's motherboard. You will need to slip the rear-facing edge of the PowerCache under the black gasket at the rear of the computer.

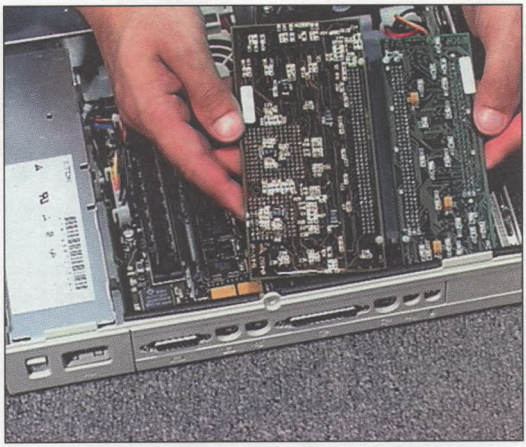


Figure 20 - Maneuvering combined boards

11. When the combined board is aligned over the motherboard's PDS slot, gently press down until it is fully seated.

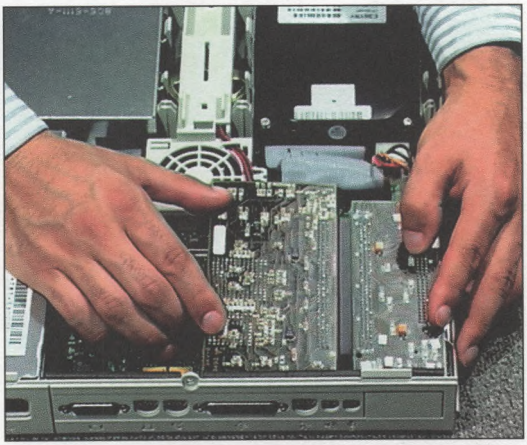


Figure 21 - Seating the combined boards

12. Install rubber pad to the back of the installed PowerCache, as shown below.

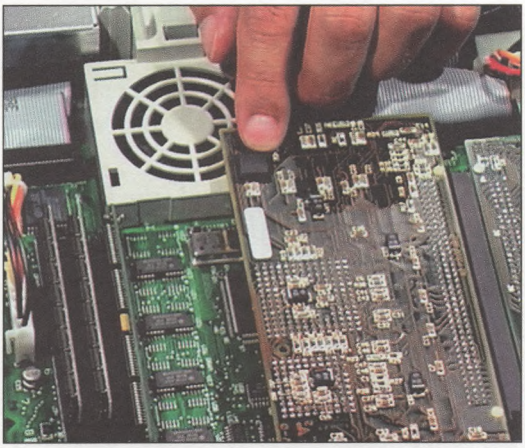


Figure 22 - Installing rubber pad on the PowerCache

Installation of the PowerCache assembly is complete. Now you must test the installation and install the software. **Please read all of this section before you test the installation.**

Testing the installation

Plug the AC power cord into the back of the Macintosh. Press the power switch on the back of the Macintosh. You should hear a shorter version of the customary BONG. If you do not hear the BONG, go to the next page.

YES! I hear the BONG.

1. Turn the power off and remove the AC power cord from the Mac.
2. Replace the case cover and retaining screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the PowerCache Software."

NO! I DO NOT hear the BONG.

Symptom: There is no response when the power to the Macintosh is turned on.

Symptom: The Macintosh doesn't startup properly when the power is turned on.

Symptom: A different sound *(the failure tone)* is heard when power is turned on.

If you experience any of the above, remove the AC power cord from the back of the Mac, then do the following:

1. Review Chapter 3 and verify proper installation. Then,
   - Squeeze the PowerCache and adapter board together.
   - Push down on the PowerCache assembly with your fingers over the motherboard PDS socket.
2. Plug the AC power cord into the back of the Macintosh and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

CHAPTER 4

Installing The PowerCache–Mac II

Prepare the Macintosh II for installation

Installation of the DayStar PowerCache was designed to be easy. You must, however, take certain precautions:

1. **Backup your hard drive** before beginning the installation.
2. **Turn off the Macintosh II** and remove the AC power cord and all accessory cables from the back of the Macintosh.
3. **Press the power switch** on the right rear of the Mac three times to drain the power supply.
4. **Place the Macintosh II** on an unobstructed flat work area with the front of the Macintosh facing you.

Begin the installation

1. Using a small Phillips head screwdriver, remove the single screw in the rear of your Macintosh II.

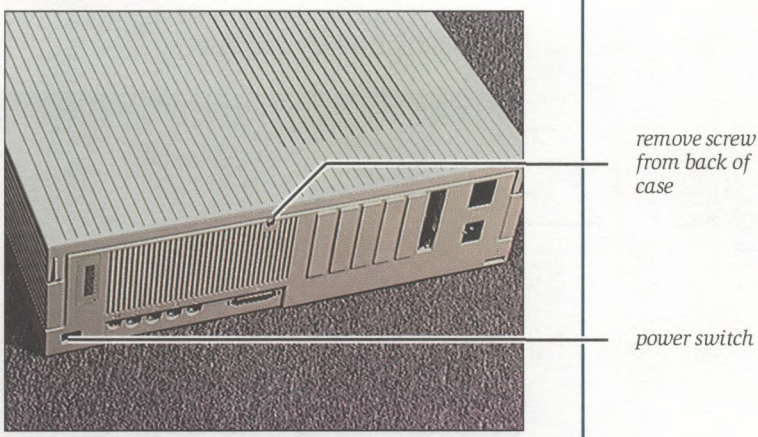


Figure 23 - Rear view of the Macintosh II

2. Firmly depress the two latches on both sides of the back cover while lifting the cover from the Macintosh. Note: This procedure is detailed in the Apple Macintosh II Owner's Guide.

depress two latches and lift top corners

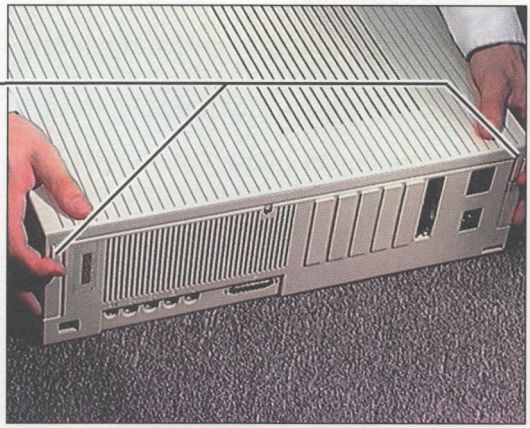


Figure 24- Opening the cover

3. Remove the screws (four) on each corner of the disk tray that attach the tray to the Macintosh II. Be careful not to drop the screws into the machine. Place the screws in a safe place so they can be replaced once the installation is complete.

remove four phillips head screws

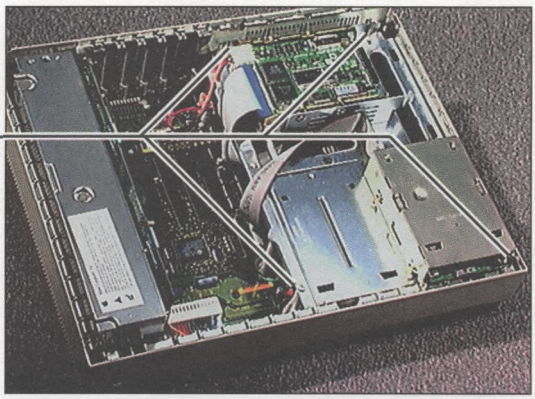


Figure 25 - View of the disk tray

4. Find where the disk drive cables connect to the motherboard. You must put them back in the same place. Unplug the floppy disk drive cable. Unplug the hard disk cable by swinging the two latch locks outward on the hard drive connector. Unplug the hard drive's power plug from the motherboard.

Removing the drive tray

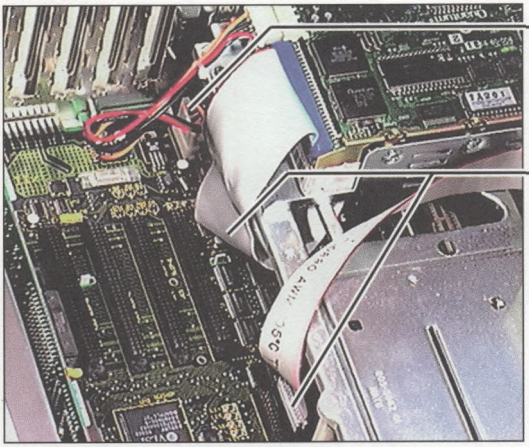


Figure 26 - View of the cables

5. Remove the disk tray and put it in a safe place. The motherboard is now fully exposed.

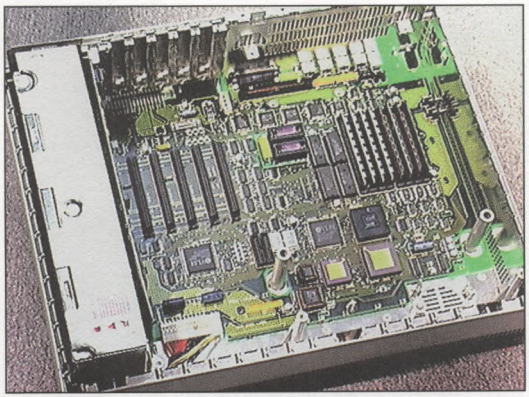


Figure 27 - View of the motherboard

Installing SIMMs

If you are also installing memory modules (SIMMs), you should do so at this time. With the drive tray removed, motherboard SIMMs can now be easily accessed.

You are now ready to proceed with the installation of the PowerCache for the Mac II.

Removing the CPU chip

Before installing the DayStar PowerCache, you must remove the original Macintosh MC68020 CPU chip and AMU. (Some Mac IIs have a PMMU instead of an AMU. Follow the same procedure for either chip). Find the Pin Grid Array (PGA) puller for removing these chips in the PowerCache adapter box.

Figure 28 - PGA puller assembled

1. Remove the wing nut from the top of the PGA puller. Separate the puller into three parts: the outer tool, the inner tool, and the wing nut.

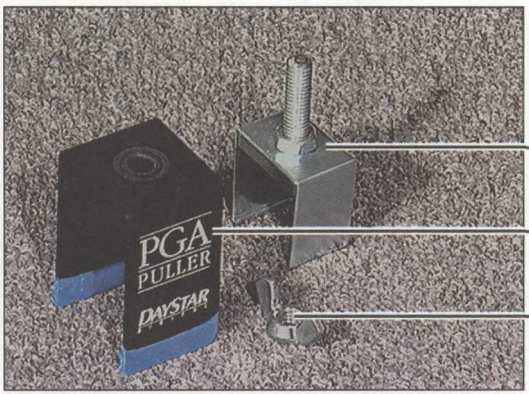


Figure 29 - PGA puller disassembled

2. Locate the 68020 chip and AMU chip on the lower right front of the Macintosh II motherboard. The 68020 chip is marked MC68020. The AMU is a black chip with multiple markings.

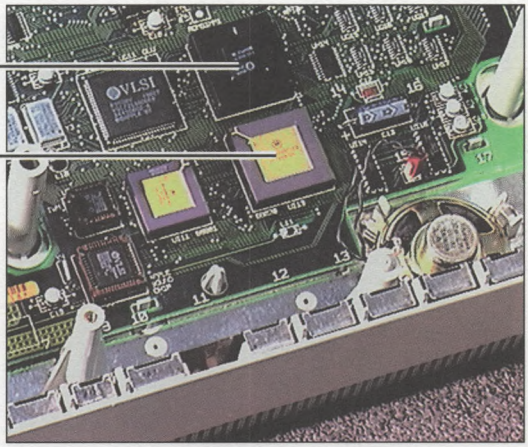


Figure 30 - 68020 chip and AMU chip

3. From the side of the CPU, gently slide the inner tool over the MC68020 chip.

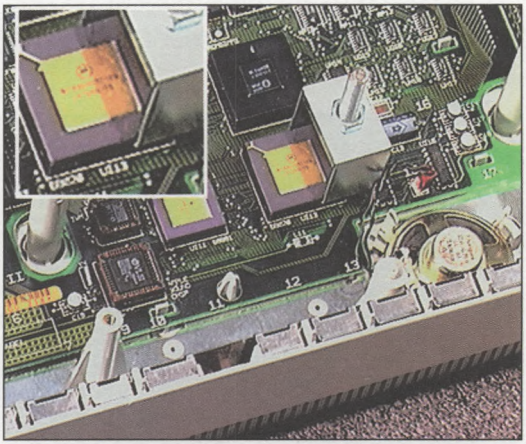


Figure 31 - Inner tool sliding over the 68020 chip

4. While gently pressing the sides of the tool inward, slowly slide it until the teeth of the tool are firmly seated under the lip of the chip.

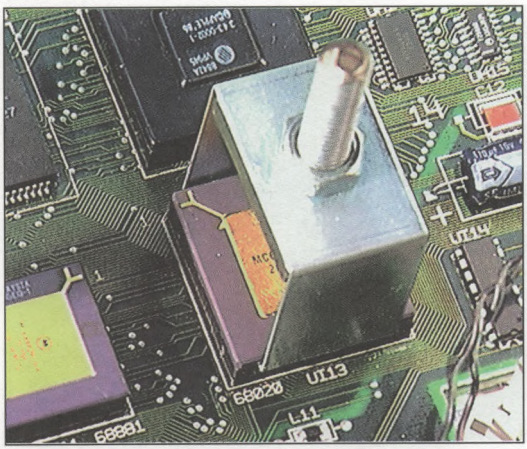


Figure 32 - Inner tool over processor

5. At a 90 degree angle, place the outer tool over the inner tool that is seated on the chip. The tool should rest on the mother-board, and not on any other chips. Put the wing nut on the threaded piece. Go to the next step.

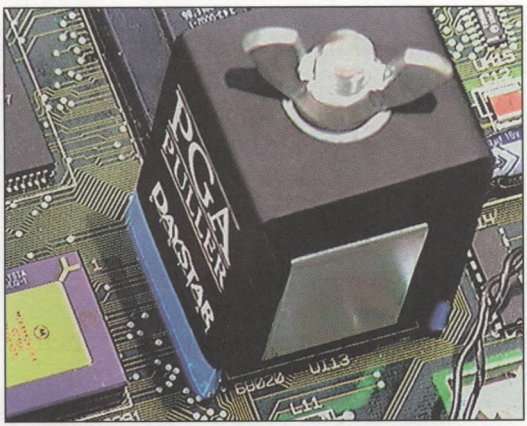


Figure 33 - Outer tool over processor

6. While maintaining gentle pressure on the sides of the inner tool, slowly turn the wing nut clockwise. This lifts the CPU from its socket evenly.

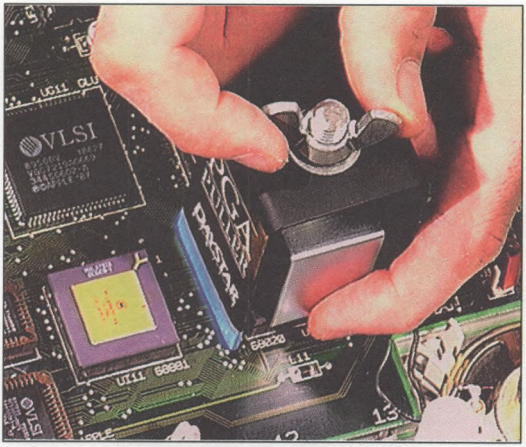


Figure 34 - Removing the 68020 chip

7. Put the CPU in a safe place so that you may reinstall it later if necessary.

   Tip: After you install the PowerCache, use the protective foam you will be removing from the adapter board to protect the pins on your CPU.

   Tip: Store the chips inside the Mac, up in front of the motherboard - they're out of the way and easy to find if you ever need them. Do not allow any metal parts of the stored chips to contact the motherboard.

Removing the AMU chip

Repeat the process to remove the black AMU chip, which is located above the 68020 processor socket (see Figure 28 on page 56). When placing the inner tool over the AMU chip, slide the tool over the AMU.

Installing the adapter board

1. The adapter board contains two sets of square pins that connect the PowerCache to the CPU and AMU sockets on the Mac II motherboard. Remove the protective foam from the adapter's pins.

2. Locate the CPU and AMU sockets. This is where the adapter board will be installed.

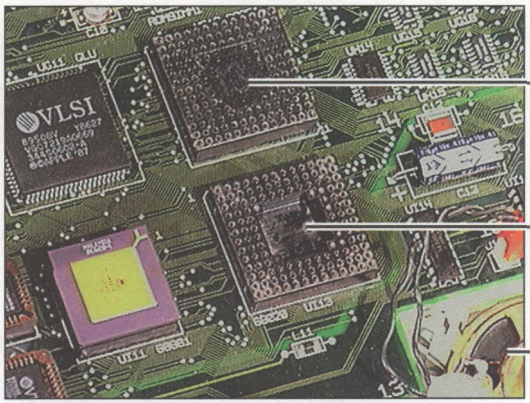


Figure 35 - CPU and AMU removed from sockets

3. Orient the adapter board so that the pins on the adapter align precisely with the motherboard CPU and AMU sockets. The adapter should be aligned so that the 120 pin connector is toward the front of the machine.

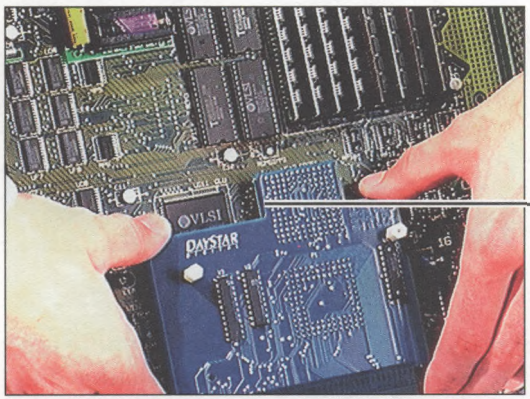


Figure 36 - Aligning the adapter board

NOTE: you should only feel light to medium resistance. If you have to push with extreme force, the pins have not been properly aligned and will bend.

4. Gently press above the center of the socket connections on the adapter board until it is fully seated.

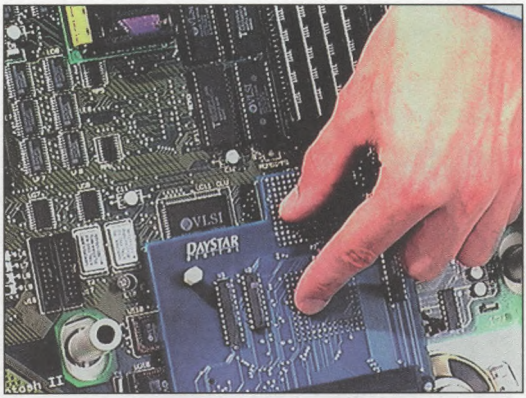


Figure 37 - Press on center of socket connections

Installing the DayStar PowerCache

5. Align the PowerCache card with the included adapter board so that the PowerCache is face up and the connector is toward the front of the machine. Squeeze the connectors together with both hands until the board is fully seated.

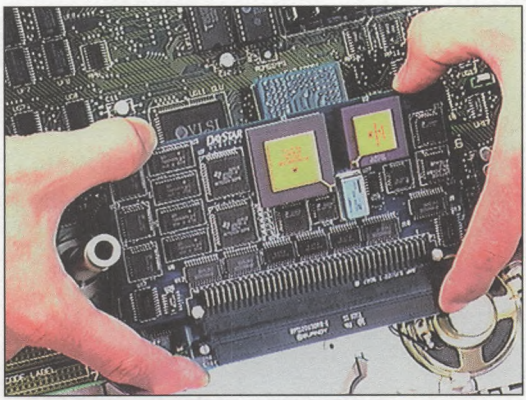


Figure 38 - Install PowerCache

Installation of the PowerCache assembly is complete. Now you must test the installation and install the software.

Testing the installation

Please read all of this section before you test the installation.

Plug the AC power cord into the back of the Macintosh. Press the power switch on the back of the Macintosh. You should hear a shorter version of the customary BONG. If you do not hear the BONG, go to the next page.

YES! I hear the BONG.

1. Turn the power off and remove the AC power cord from the Mac. Reinstall the disk drive tray by placing the tray back on its posts. Replace the four screws.
2. Insert the floppy disk drive cable, hard disk cable, and power connector into the appropriate sockets on the motherboard.
3. Replace the case cover and retaining screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the PowerCache Software."

NO! I DO NOT hear the BONG.

Symptom: There is no response when the power to the Macintosh II is turned on.

Symptom: The Macintosh II doesn't start-up properly when the power is turned on.

Symptom: A different sound *(the failure tone)* is heard when power is turned on.

If you experience any of the above, remove the AC power cord from the back of the Mac II, then do the following:

1. Review Chapter 4 and verify proper installation. Then,

   · Squeeze the PowerCache and adapter board together.

   · Push down on the PowerCache assembly with your fingers in the center of the CPU and AMU sockets.

2. Plug the AC power cord into the back of the Macintosh II and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

CHAPTER 5

Installing The PowerCache–Mac IIx

Prepare the Macintosh IIx for installation

Installation of the DayStar PowerCache was designed to be easy. You must, however, take certain precautions:

1. **Backup your hard drive** before beginning the installation.
2. **Turn off the Macintosh IIx** and remove the AC power cord and all accessory cables from the back of the Macintosh.
3. **Press the power switch** on the right rear of the Mac three times to drain the power supply.
4. **Place the Macintosh IIx** on an unobstructed flat work area with the front of the Macintosh facing you.

Begin the installation

1. Using a small Phillips head screwdriver, remove the single screw in the rear of your Macintosh IIx.

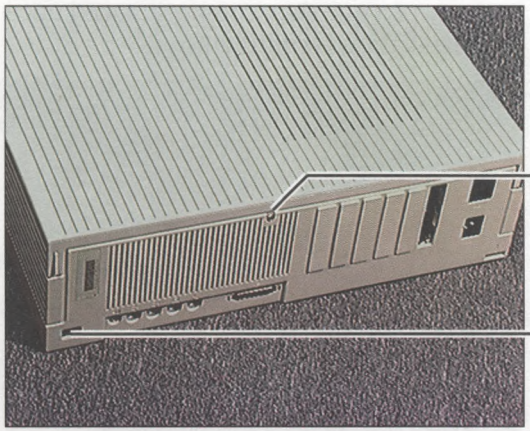


Figure 39 - Rear view of the Macintosh IIx

2. Firmly depress the two latches on both sides of the back cover while lifting the cover from the Macintosh. NOTE: This procedure is detailed in the Apple Macintosh IIx Owner's Guide.

depress two latches and lift top corners

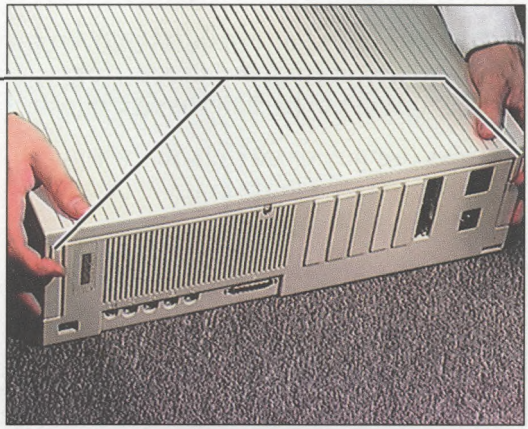


Figure 40 - Opening the cover

3. Remove the screws (four) on each corner of the disk tray that attach the tray to the Macintosh IIx. Be careful not to drop the screws into the machine. Place the screws in a safe place so they can be replaced once the installation is complete.

remove four phillips head screws

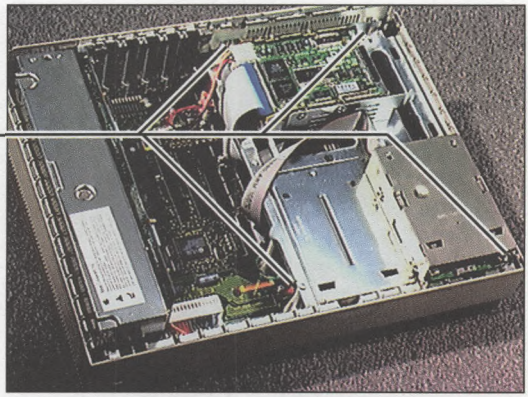


Figure 41 - View of the disk tray

Removing the drive tray

4. Find where the disk drive cables connect to the motherboard. You must put them back in the same place. Unplug the floppy disk drive cable. Unplug the hard disk cable by swinging the two latch locks outward on the hard drive connector. Unplug the hard drive's power plug from the motherboard.

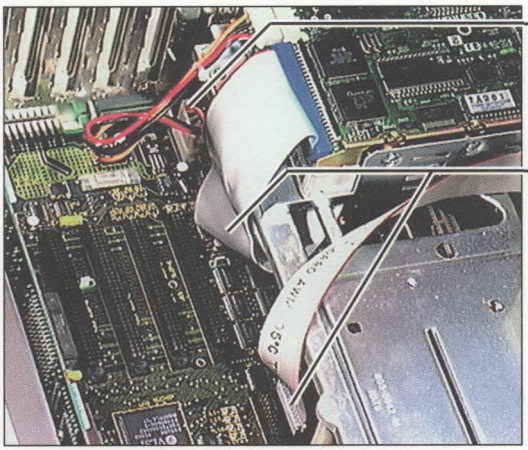


Figure 42 - View of the cables

5. Remove the disk tray and place it in a safe location. The motherboard will be fully exposed.

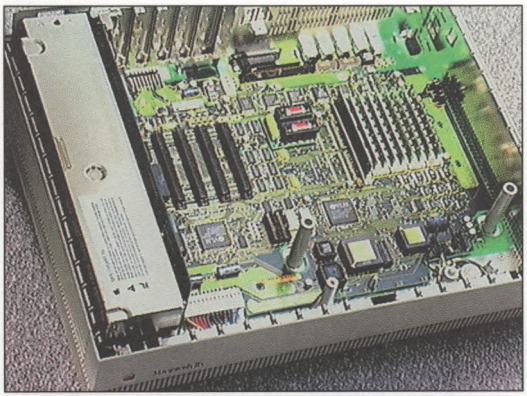


Figure 43 - View of the motherboard

Installing SIMMs

If you are also installing memory modules (SIMMs), you should do so at this time. With the drive tray removed, motherboard SIMMs can now be easily accessed.

You are now ready to proceed with the installation of the PowerCache for the Mac IIx.

Removing the CPU chip

Before installing the DayStar PowerCache, the original Macintosh MC68030 CPU chip must be removed. DayStar has provided a Pin Grid Array (PGA) Puller for removing this chip in the PowerCache adapter box. (See "Inspecting the CPU chip"section, on page 82, for examples of Soldered and Socketed CPU chips.)

NOTE: A very few Mac IIx CPU's are soldered to the motherboard. Be sure to check your chip before proceeding. If this is the case - contact DayStar Technical Support on information on how to proceed.

Figure 44 - PGA puller assembled

1. Remove the wing nut from the top of the PGA Puller, separating it into three parts: the outer tool, the inner tool, and the wing nut.

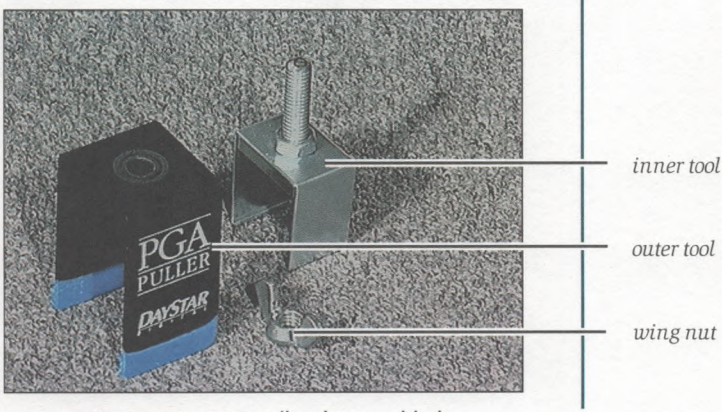


Figure 45 - PGA puller disassembled

2. Locate the CPU on the lower right front portion of the Macintosh IIx motherboard. The CPU is marked MC68030 (plus some additional characters).

68030 (CPU) chip

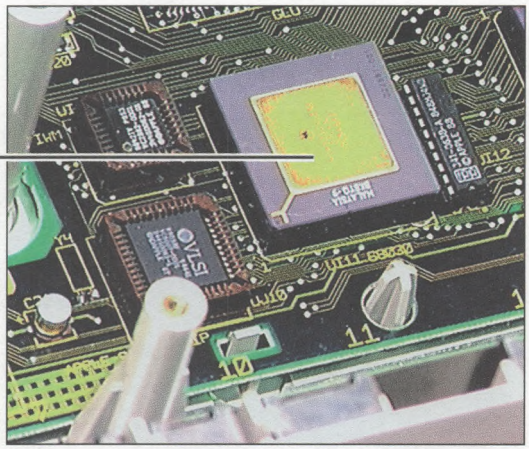


Figure 46 - 68030 location

3. Gently slide the inner tool over the MC68030 processor, sliding from the rear of the CPU.

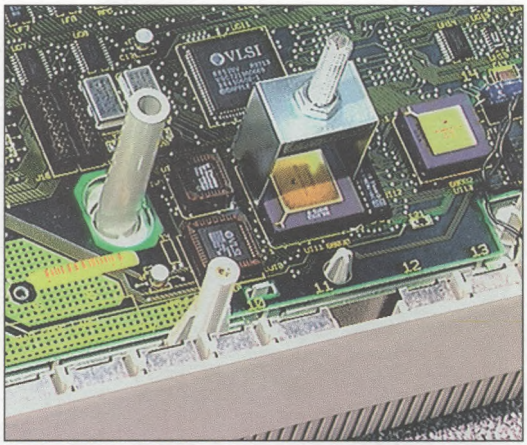


Figure 47 - Inner tool sliding over the 68030 processor

4. Slowly slide the tool, while gently pressing its sides inward, until the teeth of the tool are firmly seated under the lip of the CPU.

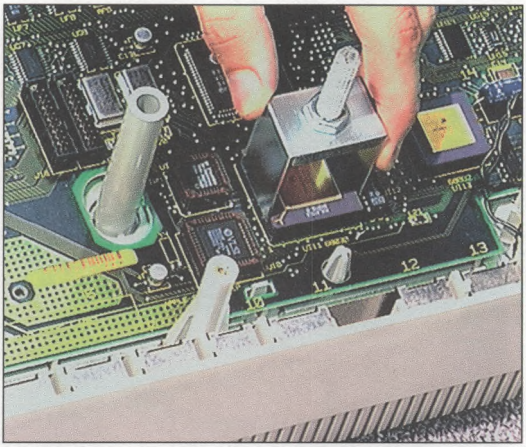


Figure 48 - Inner tool over processor

5. Place the outer tool over the inner tool that is seated on the CPU. The outer tool should be at a 90 degree angle to the inner tool. The tool should rest on the motherboard, and not on any other chips. Start turning the wing nut onto the threaded piece.

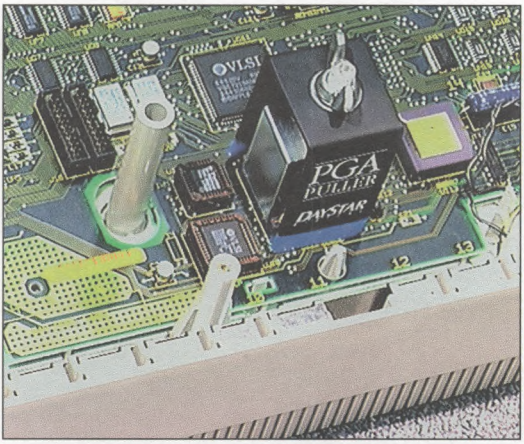


Figure 49 - Outer tool over processor

6. While maintaining gentle pressure on the sides of the inner tool, slowly turn the wing nut clockwise. This will lift the CPU from its socket evenly.

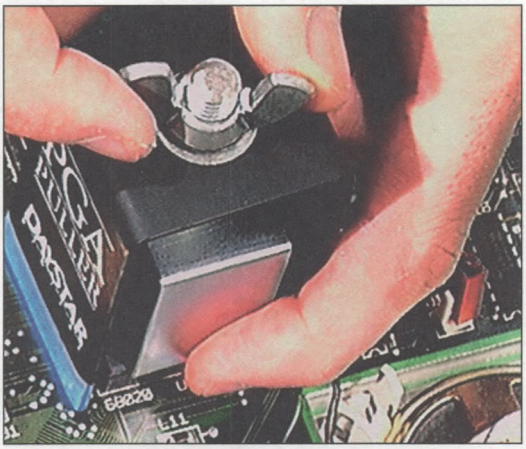


Figure 50 - Removing the processor

7. Put the CPU in a safe place so that you may reinstall it later if necessary.

Tip: After you install the PowerCache, use the protective foam you will be removing from the adapter board pins to protect the pins on your CPU.

Tip: Store the CPU inside the Mac, up in front of the motherboard – it's out of the way and easy to find if you ever need it. Do not allow any metal parts of the stored chip to contact the motherboard.

1. Included in your PowerCache package is a small rubber pad. Remove the backing from the pad and place the pad on top of the Mac's speaker. This will protect the back of the PowerCache from contact with the speaker's metal surface.

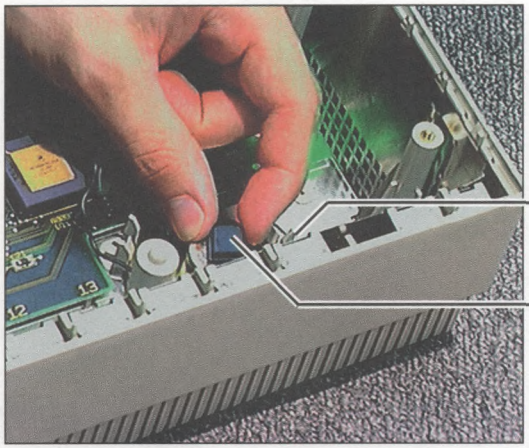


Figure 51 - Apply pad to speaker

2. Align the PowerCache card with the included adapter board. Squeeze the connectors together with both hands until the board is fully seated.

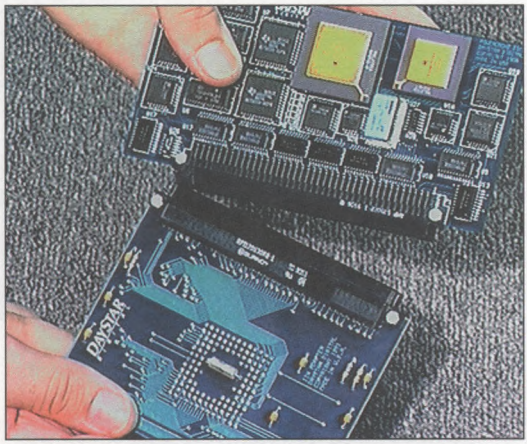


Figure 52 - Connecting the PowerCache to the Adapter

Installing the DayStar PowerCache

NOTE: you should only feel light to medium resistance. If you have to push with extreme force, the pins have not been properly aligned and will bend.

3. Remove the protective foam from the adapter's pins on the back of the board.
4. Orient the combined board so that the pins on the adapter align precisely with the motherboard CPU socket. As you face the front of the machine, the adapter will be to the left and the PowerCache to the right.

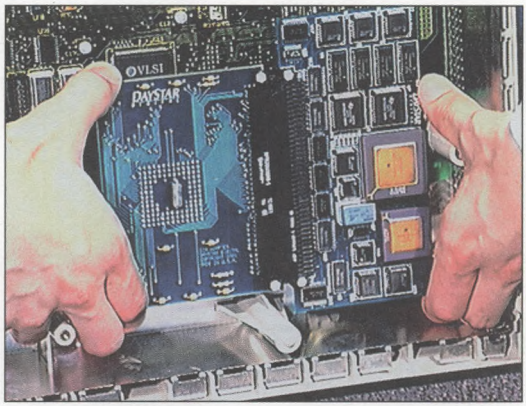


Figure 53 - Aligning the combined boards

5. Gently press above the center of the socket connection of the board until it is fully seated.

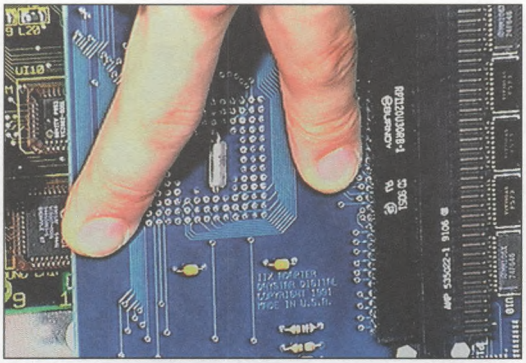


Figure 54 - Press on center of socket connection

Installation of the PowerCache assembly is now complete. You are ready to proceed with testing and software installation.

Testing the installation

Please read all of this section before you test the installation.

Plug the AC power cord into the back of the Macintosh. Press the power switch on the back of the Macintosh. You should hear a shorter version of the customary BONG. If you do not hear the BONG, go to the next page.

YES! I hear the BONG.

1. Turn the power off and remove the AC power cord from the Mac. Reinstall the disk drive tray by placing the tray back on its posts. Replace the four screws.
2. Insert the floppy disk drive cable, hard disk cable, and power connector into the appropriate sockets on the motherboard.
3. Replace the case cover and retaining screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the PowerCache Software."

NO! I DO NOT hear the BONG.

Symptom: There is no response when the power to the Macintosh IIx is turned on.

Symptom: The Macintosh IIx doesn't startup properly when the power is turned on.

Symptom: A different sound *(the failure tone)* is heard when power is turned on.

If you experience any of the above, remove the AC power cord from the back of the Mac IIx, then do the following:

1. Review Chapter 5 and verify proper installation. Then,

   · Squeeze the PowerCache and adapter board together.

   · Push down on the PowerCache assembly with your fingers in the center of the CPU socket.

2. Plug the AC power cord into the back of the Macintosh IIx and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

CHAPTER 6

Installing The PowerCache– Mac IIcx

Prepare the Macintosh IIcx for installation

Installation of the DayStar PowerCache was designed to be easy. You must, however, take certain precautions:

1. **Backup your hard drive** before beginning the installation.
2. **Turn off the Macintosh IIcx** and remove the AC power cord and all accessory cables from the back of the Macintosh.
3. **Press the power switch** on the right rear of the Mac three times to drain the power supply.
4. **Place the Macintosh IIcx** on an unobstructed flat work area with the front of the Macintosh facing you.

Begin the installation

1. Using a small Phillips head screwdriver, remove the single screw in the rear of your Macintosh IIcx.

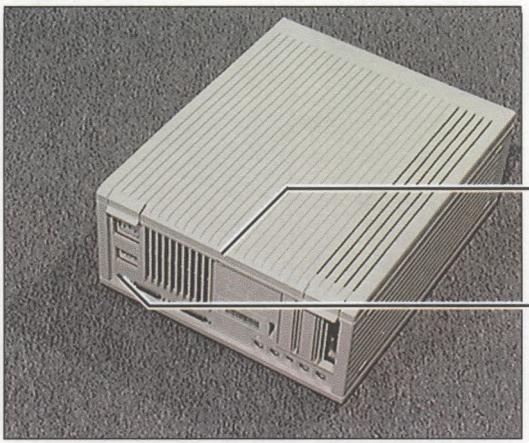


Figure 55 - Rear view of the Macintosh IIcx

2. Lift the two latches on both sides of the back cover up and out while raising the cover from the Macintosh. NOTE: This procedure is detailed in the Apple Macintosh IIcx Owner's Guide.

lift out and up on latches and raise top

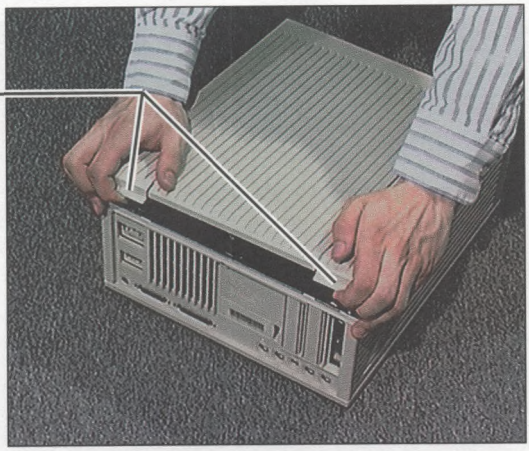


Figure 56 - Opening the cover

Removing the power supply

3. Remove the power supply from the Macintosh IIcx using the Power Supply Unlocking Tool to unlock the power supply from the case.

rest point of unlocking tool between power supply and latch

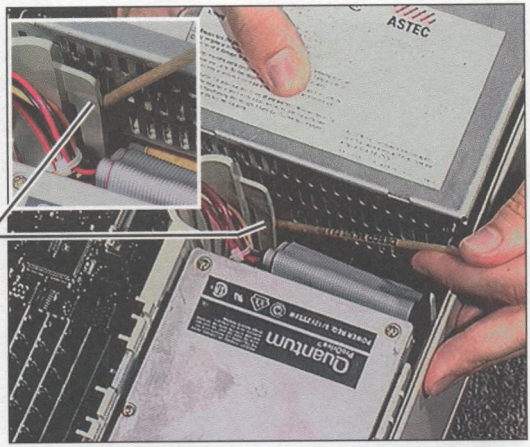


Figure 57 - View of power supply

4. Now gently rock the power supply with your hand under the power supply to remove it from the Macintosh IIcx.

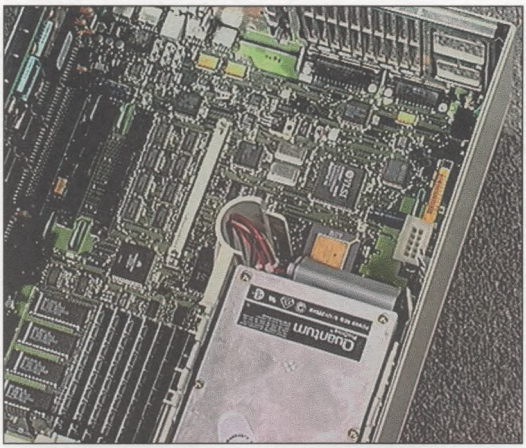
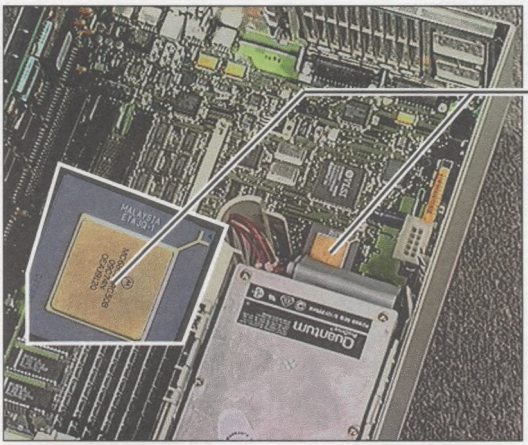


Figure 58 - View of removed power supply

5. Place the power supply in a safe location. The 68030 processor will be fully exposed.



68030 processor

Figure 59 - View of 68030

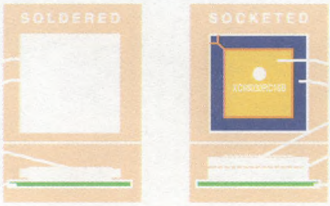
You are now ready to proceed with the installation of the PowerCache.

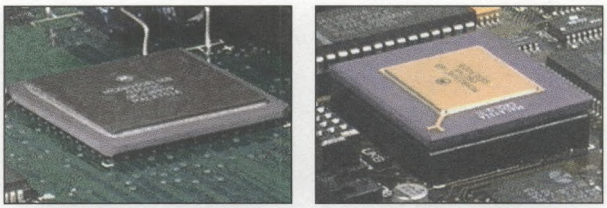
Inspecting the CPU chip

NOTE: Most Mac IIcx's have a soldered (not socketed) CPU chip. Before proceeding, contact DayStar Technical Support at 800-962-2077, or 404-967-2077, for information on how to proceed.

Before installing the DayStar PowerCache for the Macintosh IIcx, the original Macintosh MC68030 CPU chip must be removed.

Since the PowerCache requires a socket for installation, you will need to verify which type of CPU chip you have. DayStar can install a socket if your CPU is soldered. Generally, black CPU's are soldered, but check from the side to be sure of your CPU type. If you are not sure, call 800-962-2077.





(A) Picture of Soldered CPU chip (Note: Pins soldered directly into board)

(B) Picture of Socketed CPU chip (Note: Black plastic socket- pins not visible)

Figure 60 - Examples of CPU types

Due to earlier problems of customers attempting to remove soldered chips, the PGA puller was not shipped with this package. If you have verified that your Mac has a socketed chip, contact DayStar Technical Support to have a PGA puller sent to you.

Removing the CPU chip

1. Remove the wing nut from the top of the PGA Puller, separating it into three parts. These parts will be referred to as the inner tool, the outer tool, and the wing nut.

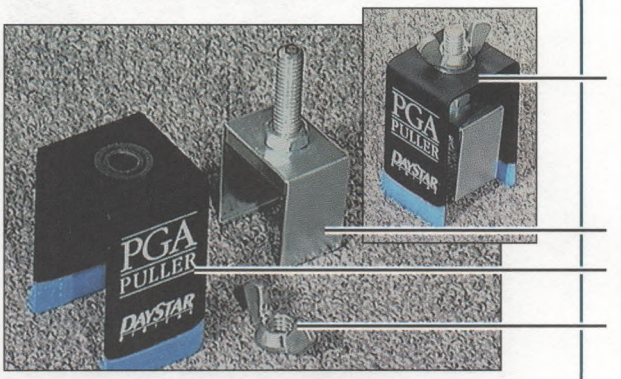


Figure 61 - PGA puller

2. Locate the CPU in the area of the Macintosh motherboard which was under the power supply. The CPU is marked MC68030.

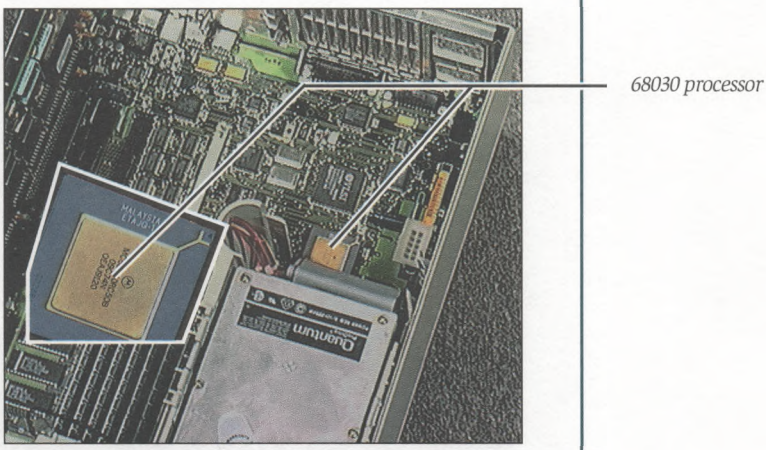


Figure 62 - 68030 location

3. Gently slide the inner tool over the MC68030 processor, sliding from the rear of the CPU.

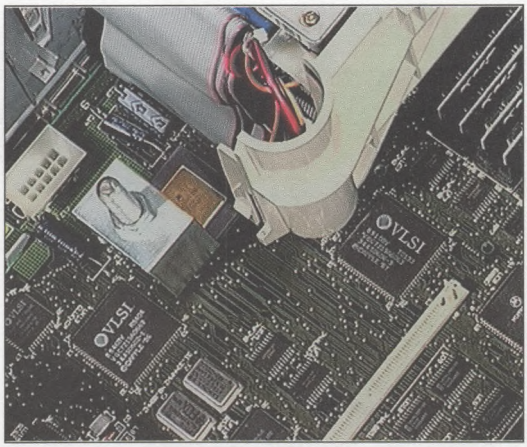


Figure 63 - Inner tool sliding over the 68030 processor

4. Slowly slide the tool while gently pressing its sides inward, until the teeth of the tool are firmly seated under the lip of the CPU.

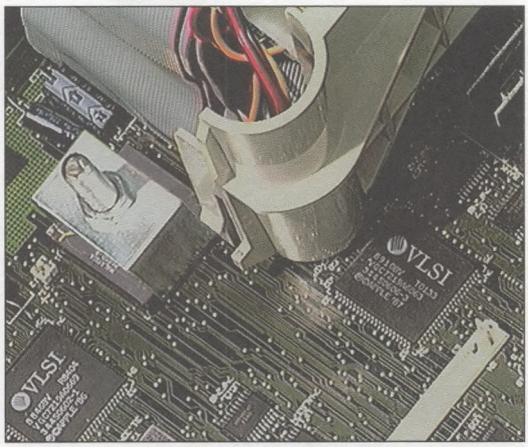


Figure 64 - Inner tool over processor

5. Place the outer tool over the inner tool that is seated on the CPU. The outer tool should be at a 90 degree angle to the inner tool. The tool should rest on the motherboard, and not on any other chips. Start turning the wing nut onto the threaded piece.

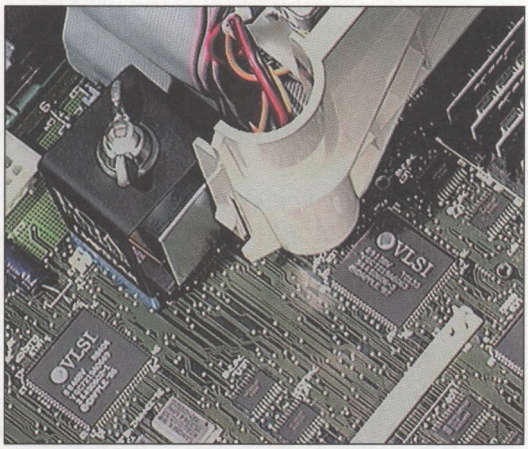


Figure 65 - Outer tool over processor

6. While maintaining gentle pressure on the sides of the inner tool, slowly turn the wing nut clockwise. This will lift the CPU from its socket evenly.

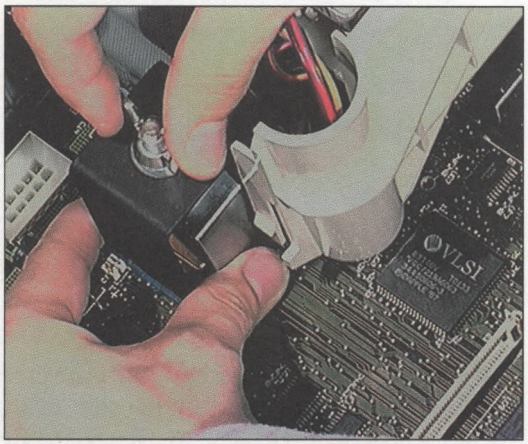


Figure 66 - Removing the processor

7. Put the CPU in a safe place so that you may reinstall it later if necessary.

Tip: After you install the PowerCache, use the protective foam you will be removing from the adapter board to protect the pins on your CPU.

Tip: Store the CPU inside the Mac, up in front of the motherboard - it's out of the way and easy to find if you ever need it. Do not allow any metal parts of the stored chips to contact the motherboard.

Installing the adapter board

1. The adapter board contains a square set of pins that connect the PowerCache to the processor socket on the Mac IIcx motherboard. Remove the protective foam from the adapter's pins.

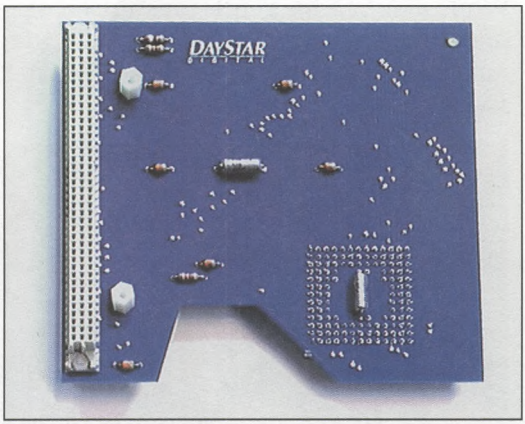


Figure 67 - Adapter board

2. The adapter's notch will align with the crescent section of the drive assembly. In order to align the adapter's pins with the motherboard CPU socket, you must slightly pull the adapter

towards the front of the machine. This will push the plastic power supply tab out of the way. *Make sure that the adapter's pins are above the CPU socket while performing this alignment.*

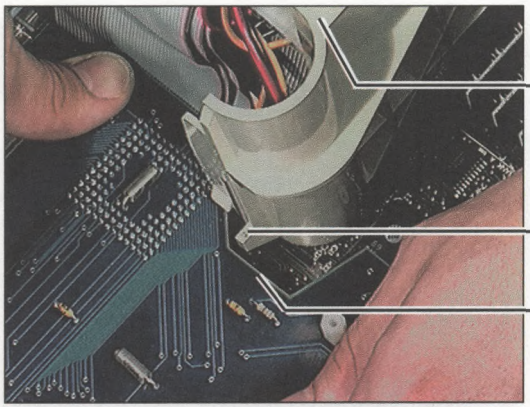


Figure 68 - Aligning the adapter board

3. With the adapter's pins aligned with the CPU socket, gently press above the center of the socket connection on the adapter board until it is fully seated. With the adapter fully seated the power supply's locking tab should spring back into place above the adapter.

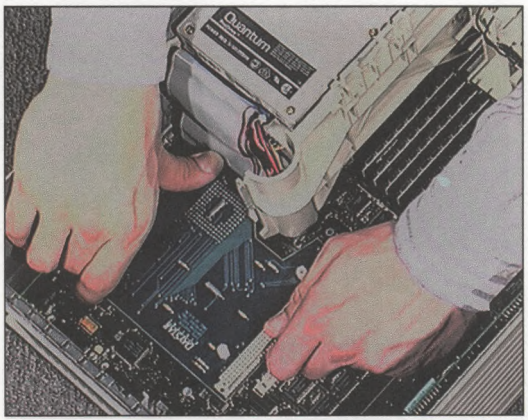


Figure 69 - Installing the adapter board

NOTE: you should only feel light to medium resistance. If you have to push with extreme force, the pins have not been properly aligned and will bend.

4. Reinstall the Macintosh IIcx power supply.
5. Align the PowerCache card with the installed adapter board. Squeeze the connectors together with both hands until the board is fully seated.

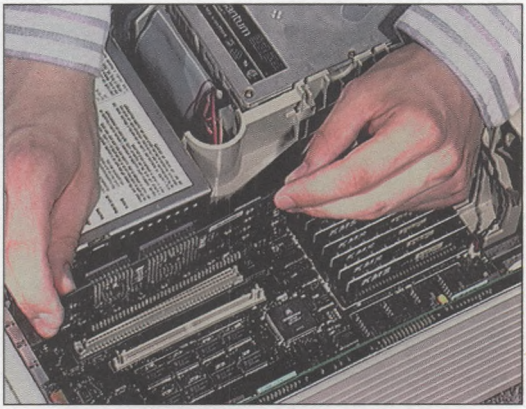


Figure 70 - Connecting the PowerCache to the adapter

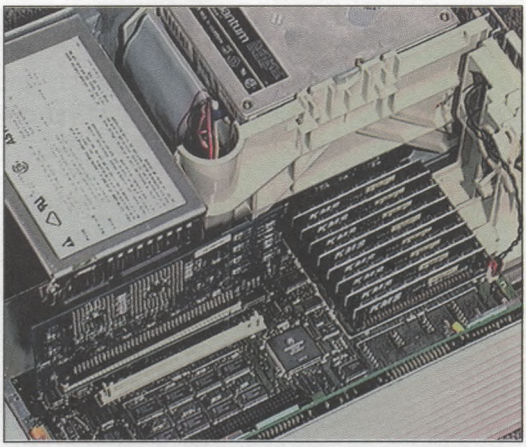


Figure 71 - The PowerCache installed

Installation of the PowerCache assembly is now complete. You are ready to proceed with testing and software installation.

Testing the installation

NOTE: Before testing the installation, read this section in its entirety.

Plug the AC power cord into the back of the Macintosh IIcx. Press the power switch on the back of the Macintosh. You should hear a shorter version of the the customary BONG. If you do not hear the BONG, go to the next page.

YES! I hear the BONG.

1. Turn the power off and remove the AC power cord from the Mac.
2. Replace the case cover and retaining screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the PowerCache Software."

NO! I DO NOT hear the BONG.

Symptom: There is no response when the power to the Macintosh IIcx is turned on.

Symptom: The Macintosh IIcx doesn't start-up properly when the power is turned on.

Symptom: A different sound *(the failure tone)* is heard when power is turned on.

If you experience any of the above, remove the AC power cord from the back of the Mac IIcx, then do the following:

1. Review Chapter 6 and verify proper installation. Then:
   - Squeeze the PowerCache and adapter board together.
   - Remove the power supply.
   - Push down on the adapter with your finger in the center of the CPU socket.
2. Reinstall the power supply. Plug the AC power cord into the back of the Macintosh IIcx and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

CHAPTER 7

Installing The PowerCache– Mac IIsi

Prepare the Macintosh IIsi for installation

The installation of the DayStar IIsi PowerCache was designed to be easy. You must, however, take certain precautions:

1. **Backup all hard drives** before beginning the installation.
2. **Turn off the Macintosh IIsi** and remove the AC power cord and all accessory cables from the back of the Macintosh.
3. **Press the power switch** on the rear of the Macintosh IIsi three times to drain the power supply.
4. **Place the Macintosh IIsi** on an unobstructed flat work area with the front of the Macintosh facing toward you.

Begin the installation

5. **Open the Macintosh IIsi case** and locate the PDS connector (see Figure 72).

NOTE: Refer to the Macintosh IIsi Owner's Guide if you are unfamiliar with removing the case cover and need further information on the procedure.

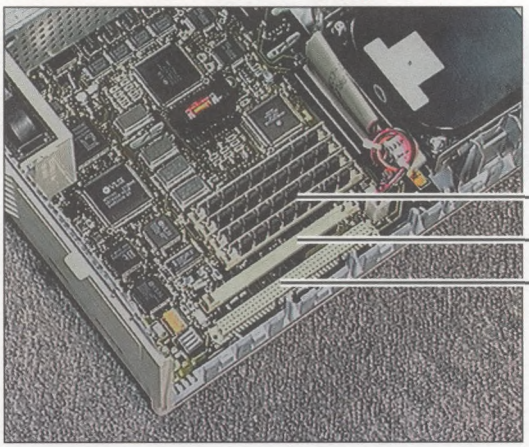


Figure 72 - View of the Macintosh IIsi

The DualPort Adapter

The DualPort IIsi is our standard connector for the installation of the PowerCache IIsi.

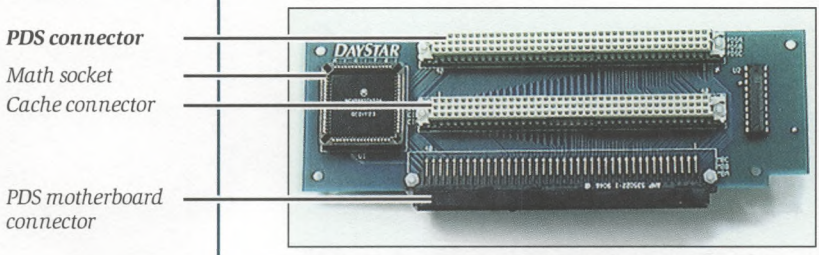


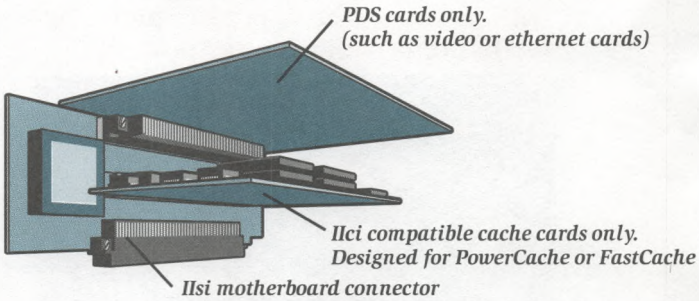
Figure 73 - The DualPort IIsi

The bottom connector of the DualPort will plug into the PDS on the Mac IIsi.

The center connector on the DualPort is for IIci compatible cache cards only; this is where you will connect the included DayStar card.

The top connector is a fully functional PDS. It follows all Apple PDS specifications. It is compatible with all conforming Mac IIsi PDS cards.

Warning: DO NOT plug any PDS boards into DualPort's center (cache) connector or IIci cache cards into the top (PDS) connector. It could result in irreversible damage!


PDS cards only.
(such as video or ethernet cards)
IIci compatible cache cards only.
Designed for PowerCache or FastCache
IIsi motherboard connector

Note: If the PowerCache has a math chip, then math chips on any other installed cards will be ignored.

Possible configurations

The DualPort IIsi has been designed to work with other third party IIsi add in cards. Contact DayStar for an up to date listing of those which we have tested.

The PDS Adapter

Our optional PDS Adapter is for use in situations where another third party PDS card must reside in the motherboard connector. (To date, the only third party card which must reside in the motherboard PDS connector is the Radius Hard Pivot video card.)

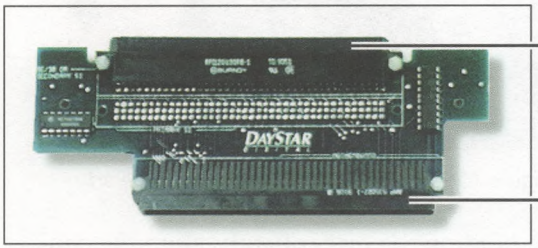
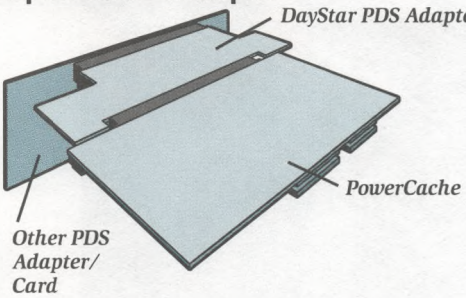


Figure 74 - The PDS Adapter

Optional PDS Adapter



Preparing the PowerCache

You should be wearing the anti-static wrist strap. Begin by first connecting the PowerCache to the middle connector of the DualPort. Note that the PowerCache will be facing up (it only fits one way).

IMPORTANT: Connect cache card to middle slot **ONLY.**

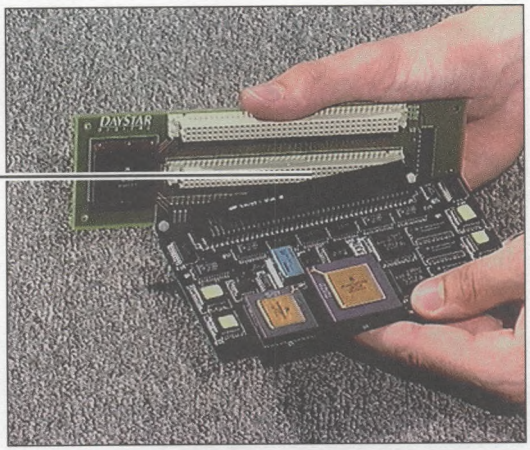


Figure 75 - Connect PowerCache to the DualPort

Installing the DayStar PowerCache

Now, holding the pieces firmly, align the connectors and plug the DualPort with the PowerCache into the IIsi PDS connector.

Plug adapter into IIsi PDS connector

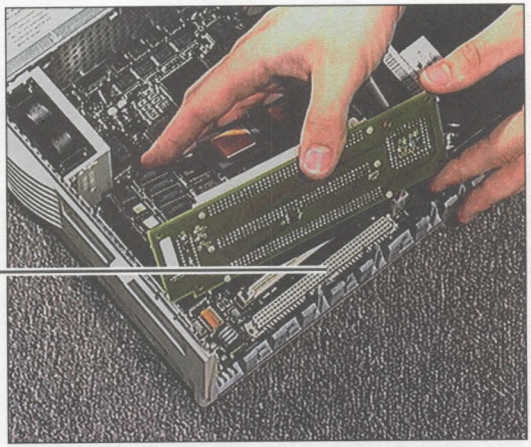
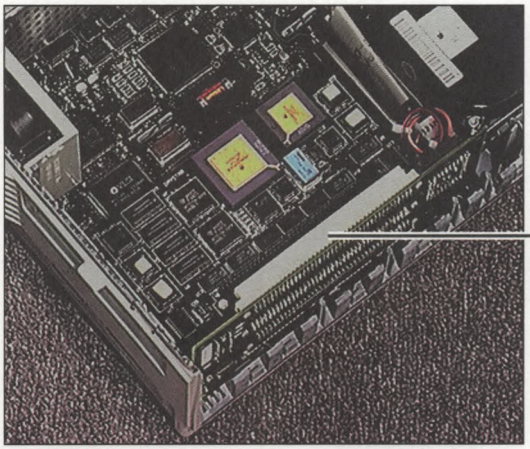


Figure 76 - Installing PowerCache/DualPort

The installation of the PowerCache and adapter is now complete. You may install additional PDS cards or an optional 20 MHz math chip (available from DayStar) at anytime.



PDS connector open for expansion with any standard IIsi PDS cards

Figure 77 - Completed installation

Check that all connections are tight. You are now ready to test the installation.

Testing the installation

Plug the AC power cord into the back of the Macintosh. Press the power switch on the back of the Macintosh. You should hear a shorter version of the customary BONG. If you do not hear the BONG, go to the next page.

YES! I hear the BONG.

1. Turn the power off and remove the AC power cord from the Mac.
2. Replace the case cover and retaining screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9, "Installing the PowerCache Software."

NO! I DO NOT hear the BONG.

Symptom: There is no response when the power to the Macintosh IIsi is turned on.

Symptom: The Macintosh IIsi doesn't start-up properly when the power is turned on.

Symptom: A different sound *(the failure tone)* is heard when power is turned on.

If you experience any of the above, remove the AC power cord from the back of the Mac IIsi, then do the following:

1. Review Chapter 7 and verify proper installation. Then,
   - Squeeze the PowerCache and adapter board together.
   - Push down on the adapter to verify good connection with the motherboard PDS socket.
2. Plug the AC power cord into the back of the Macintosh IIsi and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

CHAPTER 8

Installing The PowerCache–Mac IIci, IIvx, IIvi, Performa 600

The installation of the DayStar IIci PowerCache was designed to be easy. You must, however, take certain precautions:

1. **Backup all hard drives** before beginning the installation.
2. **Turn off the Macintosh** and remove the AC power cord and all accessory cables from the back of the Macintosh.
3. **Press the power switch** on rear of the Macintosh three times to drain the power supply.
4. **Place the Macintosh** on an unobstructed flat work area with the front of the Macintosh facing toward you.
5. **Open the Macintosh case** and locate the cache connector (see Figure 78).

NOTE: Refer to the Macintosh IIci Owner's Guide if you are unfamiliar with removing the case cover and need further information on the procedure.

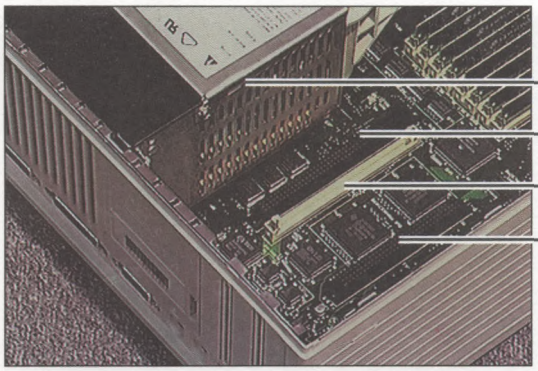


Figure 78 - View of the Macintosh IIci

Prepare the Macintosh for installation

Note on the Mac IIvx, IIvi, Performa 600: The opening of the case will vary slightly from the Mac shown. You may want to refer to your Mac's user manual.

Begin the installation

Installing the DayStar PowerCache

6. If present, remove Apple or other third party cache card from cache (Mac IIci) or accelerator (Mac IIvx, IIvi, Performa 600) slot.
7. With the component side of the PowerCache facing the power supply, align the board's connector over the 120 pin connector on the motherboard. Gently push the card down until it is fully seated.

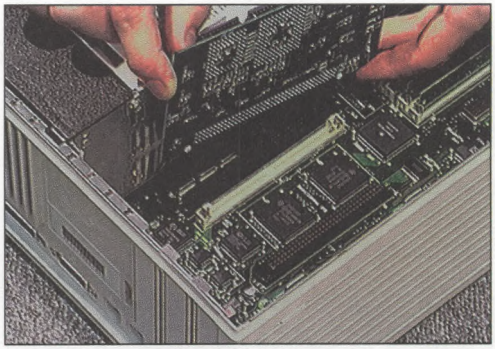


Figure 79 - Installing the PowerCache

You have installed the PowerCache. Now you must test the installation and install the software.

Testing the installation

Before testing, read ALL of this section.

Plug the AC power cord into the back of the Macintosh Press the power switch on the back of the Macintosh. You should hear the customary BONG, but it may sound slightly longer. If you do not hear the BONG, go to the next page.

If you hear the BONG.

Turn the power off. Replace the case cover, retaining screw, and attach all cables you have removed. You are now ready to install the software. Please go to Chapter 9, "Installing the PowerCache Software."

NO! I DO NOT hear the BONG.

Symptom: There is no response when the power to the Macintosh is turned on.

Symptom: The Macintosh doesn't startup properly when the power is turned on.

Symptom: A different sound *(the failure tone)* is heard when power is turned on.

If you experience any of the above, remove the AC power cord from the back of the Mac, then do the following:

1. Review Chapter 8 and verify proper installation. Then,

   · Check that the PowerCache is firmly seated in the cache slot.

2. Plug the AC power cord into the back of the Macintosh and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544 or AppleLink: DAYSTAR.TECH.

CHAPTER 9

Installing The PowerCache Software

Installing Power Central

For the PowerCache to function you must install the included Power Central software. Without Power Central installed, the PowerCache's external cache remains off, resulting in little to no speed increase.

Follow these steps to install the software for Power Central onto the hard (startup) disk:

1. Insert the DayStar disk into the floppy drive. Start the Macintosh.
2. Copy the Power Central file from the System folder on the DayStar floppy disk to:
   - *the System Folder* of your Startup hard drive if running System 6.08 or lower.
   - *the Control Panels Folder* of your Startup hard drive if running System 7.0 or above.

Power Central

Figure 80 - Copy File to System Folder

3. Restart the Macintosh. If the Macintosh does not restart from the hard disk, see the troubleshooting section at the end of this chapter.

NOTE: Check the Read Me file on the DayStar disk for late breaking news or changes.

Using Power Central

To access the Power Central software, select Control Panel(s) from the Apple pull-down menu. Select (or double click in System 7) the Power Central icon. The following screen will appear:

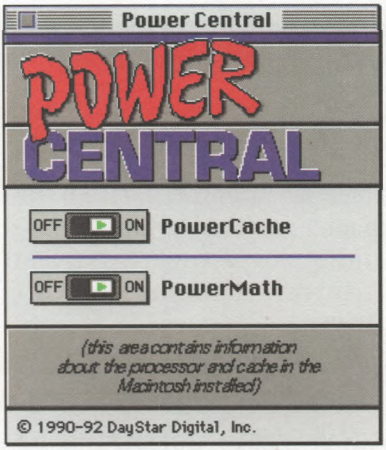


Figure 81 - Power Central Software Options

Note: PowerMath will not function if other enhanced SANE software such as RadiusMath is installed or if no math coprocessor is present.

The software options allow changes to the system operation as follows:

- **PowerCache** - Switches the PowerCache's 32K cache on and off, which enables the processor to access the most recently used 32K of code with minimum wait-states. Results are immediate.
- **PowerMath** - Allows you to invoke DayStar's PowerMath. This system level software lets applications that do not normally use the math coprocessor take advantage of the math coprocessor's speed for floating point math calculations. The PowerMath routines provide significant performance increases over Apple's SANE (Standard Apple Numeric Environment), maintaining the same level of accuracy.

  The capability to turn off the cache is provided. With the cache off, the Mac still runs at the accelerated clock speed. Performance will be significantly reduced.

Support for A/UX

The PowerCache and its Control Panel are completely compatible with A/UX. There are two ways in which you may use the PowerCache software with A/UX:

1) You may place the Power Central Control Panel into your Mac's startup System Folder. Once you launch A/UX, the Power Central will retain the settings which were established under the Mac Operating System.

   Note: Launching A/UX will disable PowerMath.

2) The Power Central software can also be installed directly into A/UX, providing benefits if:

   a) You run Mac applications under A/UX which would benefit from the PowerMath software.

   b) You wish to run A/UX with the external cache disabled, either to demonstrate the speed of the PowerCache hardware, or because you run software which is speed sensitive.

   To install, boot up A/UX, login as root, and copy the Power Central file to the "/mac/sys/System Folder" directory. The Power Central Control Panel can now be selected from the "Control Panel" under the Apple menu.

   Note: because of the security built into A/UX, changes to the Power Central control panel can only be made when you are logged in as root. All other users can view the current settings, but they cannot modify them.

Note: Because Apple does not support A/UX on the Mac LC, a PowerCache equipped LC cannot run A/UX.

Trouble-shooting

DayStar products are compatible with all standard Macintosh hardware and software. If you experience problems booting from the hard drive, and not when booting from the DayStar supplied floppy, it could be because of Control Panel (CDEV) or System Extension (INIT) incompatibilities or conflicts. (Note: If you also crash or hang off the DayStar floppy, then it is likely a hardware problem. Contact your dealer or DayStar Digital at 800-962-2077 or 404-967-2077.

Symptom: The Macintosh doesn't startup properly when the power is turned on, (the System locks up or displays a system error message).

Symptom: Particular functions within an application do not work properly and/or crash the program.

CDEV or INIT Conflicts

1. Boot from the provided DayStar floppy and remove all third party Control Panel and Extension files from the hard disk's System Folder.
2. Restart the Macintosh from the hard disk. (If the Macintosh does not start-up properly at this point, it is probably due to a contaminated System Folder. Read the next section.)
3. Starting with the Power Central file, reinstall the Control Panel and Extension files into the System Folder one at a time. Restart the machine after adding each file until you encounter the problem. After this happens, restart from a floppy and remove the last file loaded. Proceed again with the systematic check until you have removed all conflicts.

NOTE: Some conflicts can be overcome by changing the first character of the troublesome file's name. Since these files load in alphabetical order, this will alter the order in which they load.

System Software Contamination

If you remove all of the non-Apple Control Panel and Extension files and are still having problems, you are probably experiencing system contamination. In order to fix this problem you will need to do the following:

1. Boot from the provided DayStar floppy. Move printer fonts to a new folder outside the System Folder. Remove the System Folder on the hard disk by placing it in the trash.

   NOTE: You must throw away the System file instead of installing a new one on top of the old one. DayStar recommends you use Apple's System Installer rather than dragging software over to the hard drive.

2. Using the Apple Installer, reinstall the System software on the hard disk. Copy the Power Central file to the newly installed System Folder.

3. Restart the Macintosh.

If the Macintosh still does not restart, please contact your dealer or DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077.

APPENDIX A

Performance Tips And Adding A Math Chip

Performance tips

- Keep the number of Control Panel and System Extension files that you have in the System Folder to a minimum. If you find that you are not using the features of such a file, remove it from the System Folder. Not only can these files cause conflicts with one another, they can also rob the system's performance.
- By placing an option space in front of Power Central CDEV's name, it will load sooner. This speeds up the booting process by turning on Power Central sooner.
- Vary the size of the Apple RAM Cache (or Disk Cache in System 7) in order to find an optimum setting for your system. The cache is located in the General Control Panel under System 6.x, or in the Memory Control Panel under System 7.x. Setting the cache above 128K with System 6.x often degrades performance.
- When installing the System software we suggest that you first completely remove the hard drive's original System file. In some cases the Apple Installer will not completely remove the corrupted part of the System. Starting from scratch assures having a "clean" System.

Adding a 68882 Math chip

If you purchased a PowerCache without a math chip and wish to add a chip, you must ensure that it is installed in the correct orientation. The math chip's number one pin is highlighted by what appears to be a tall "Y" in one corner. Holding the card as shown below, this corner of the math chip should be pointed down and to the left. The Math chip must be the same speed as the PowerCache's CPU.

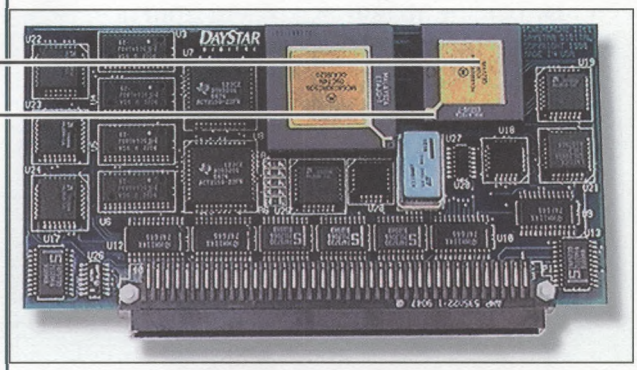


Figure 82 - Math chip orientation

If the chip is improperly aligned it will cause bent pins and possibly a permanently damaged chip. DayStar will not replace a damaged chip.

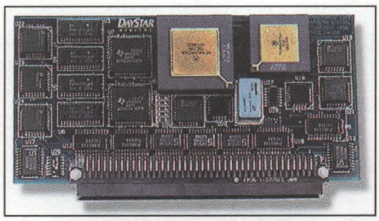
Installing the math chip will require a reasonable amount of pressure to ensure that it is fully seated on the PowerCache. We recommend that installation be done on a flat surface that provides a slight cushion to the card.

If you have any questions please contact DayStar Technical Support (9 am to 6 pm EST) at 800-962-2077 or 404-967-2077.

IMPORTANT NOTE: If you are adding a 68882 math chip to your DayStar board, keep in mind that if the chip was not purchased from DayStar we cannot guarantee or warranty its operation. Also, when and if the unit is returned for an upgrade, DayStar will only offer credit equivalent to a unit without a math chip. If you purchase a math chip from DayStar, be sure to keep the invoice for warranty purposes and for full credit when upgrading.

APPENDIX B

Product Support



System Requirements

- Apple® Macintosh Classic, SE, LC, LC II, SE/30, II, IIx, IIcx, IIsi, IIci, IIvx, IIvi and Performa 400, 600

· Cache Architecture

- 32K direct-mapped physical cache with 32 bit cache line
- Superfast Static RAM

· Processor

- Motorola® MC 68030
- Motorola MC 68882 math processor (optional) 33, 40 or 50 MHz

· Speed

- 33, 40 or 50 MHz

· Software

- Control Panel for cache and buffer management
- PowerMath to speed up Apple SANE math

· Connector

- 120 Pin Cache Slot

· Compatibility

- Compatible with System 6.0 up and standard Macintosh software & hardware
- A/UX compatible (on all but the Mac LC, LC II, and Performa 400)

· Warranty

- 3 year limited warranty

Product warranty

DayStar Digital, Inc. warrants that it will repair or replace, at its option, any defective products properly returned to our factory at no additional charge for a period of THREE (3) FULL YEARS from the date the product is purchased by the original end user.

This warranty does not apply if the hardware product has been damaged by accident, misuse, or abuse including installation with non-compatible products, or has been modified in any way, or if the serial number has been removed or defaced. This warranty does not apply to damage or failure of the host computer power supply, analog and/or CPU logic board, or any other add-in boards. This warranty is extended only to original end users.

THE GUARANTEE, WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESSED, OR IMPLIED. DAYSTAR IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR UNDER ANY LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY AND ANY COSTS OF RECOVERING, PROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED OR USED WITH DAYSTAR PRODUCTS.

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Upgrading the PowerCache

The DayStar Swap-Up Program - We protect your investment. Should your need for speed ever increase, we are happy to inexpensively upgrade you to the top of the line. The cost of any upgrade within the same product category is simply the difference between the list price of the product you own and the product you want (on the current price list). Costs for cross-platform and math chip upgrades are calculated the same way.

Contact DayStar Customer Service at 800-962-2077 or 404-967-2077 to schedule upgrades.

How to return your board for service

Before you return the product, please call the DayStar Technical Support Department for assistance at 800-962-2077 or 404-967-2077. Many times we can solve problems without asking you to send the board in for service. If the board does need service, please take it back to the dealer who sold it to you.

We will be happy to serve you. Items returned for service must have an RA number, which will be issued to you or your dealer when you call DayStar's Technical Support Department. Returned items must be sent back in good condition, unmodified and undamaged, with shipping charges prepaid. DayStar will repair or replace the board and ship it back to you or your dealer. For each item you return you must enclose your name, address, telephone number, RA number, a description of the problem, and a copy of the bill of sale bearing the appropriate DayStar serial numbers as proof of the original date of purchase.

Contacting DayStar online

DayStar supports a forum on CompuServe located in the Mac A Vendor Forum, Section 6. Our corresponding library is LIB 6. You can contact DayStar through the forum or by EMail at 75300,1544.

You can also reach DayStar via AppleLink. Our software is available in our new bulletin board at the following location: Third Parties; Third Parties A-G; DayStar Digital; File Library/Utilities. Our Link address is DAYSTAR.TECH.

All correspondence and technical questions should be referred to:

DayStar Digital, Inc.
Technical Support Department
5556 Atlanta Highway
Flowery Branch, GA 30542

800-962-2077
404-967-2077
AppleLink (DAYSTAR.TECH)
CompuServe (75300,1544)

Comments on this manual are appreciated.

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This manual was designed and produced on a Macintosh with the DayStar upgrades installed.

Copyright 1992-1993, DayStar Digital, Inc.

Manual version number 2.0 A, 3/93.

Part Number: 81-00104-101 A

AL, BF, DM, GD², LF, LK, MJ, PS, BT, ST, VT

General Information

Purchase Date: _____

Purchased From: _____

Serial No.: _____

Registration Sent: _____

System Configuration: _____

_____

Notes: _____

_____

_____

_____

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_____

_____

_____

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NOTES

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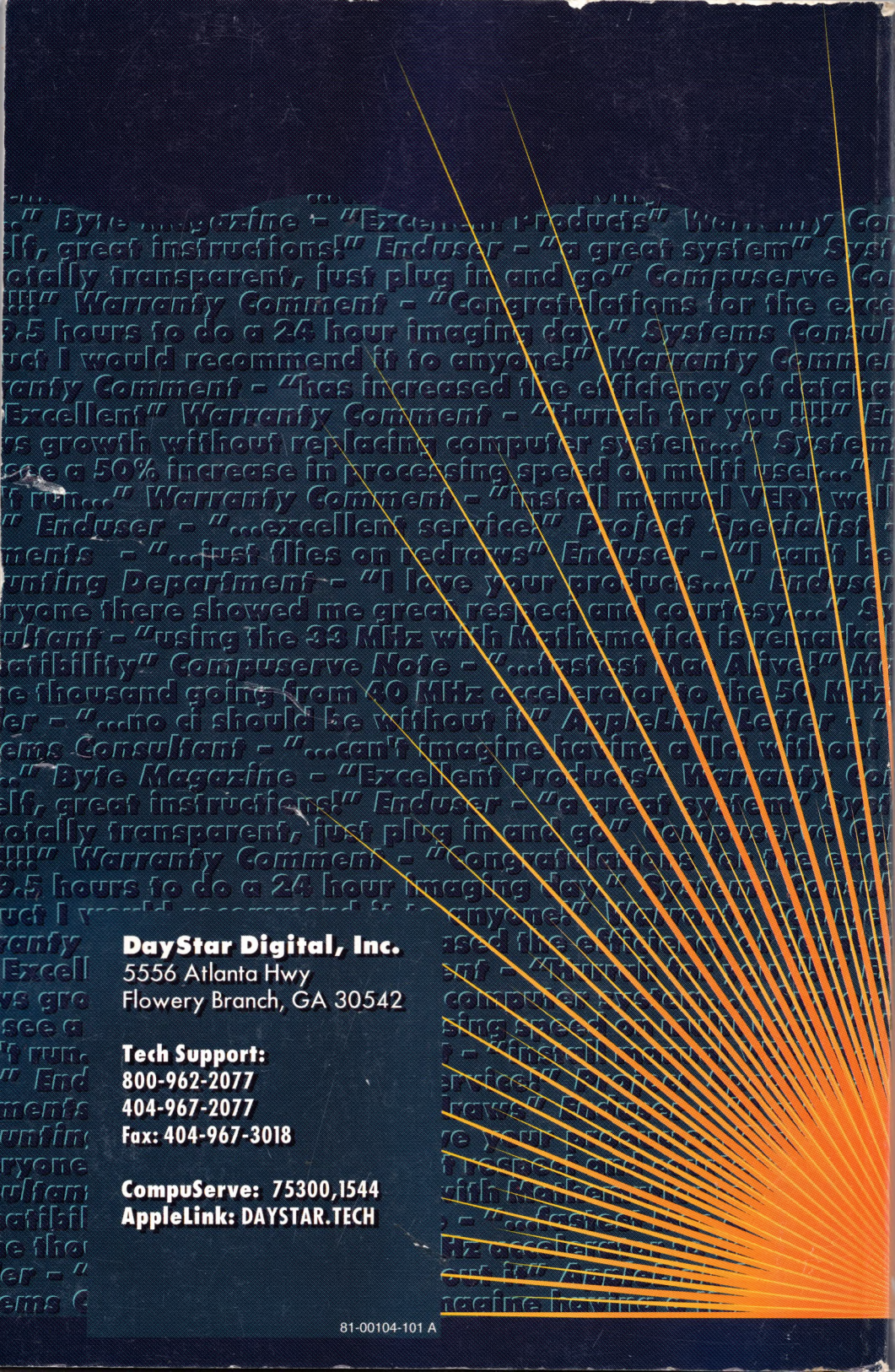

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404-967-2077
Fax: 404-967-3018

CompuServe: 75300,1544
AppleLink: DAYSTAR.TECH

81-00104-101 A